# NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

NetworkWorld
TECHNICAL SEMINARS

# Frame Relay '98℠

## Building and managing a cost-effective network

### 1998 Seminar Tour

| | |
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| April 15 | Boston, MA |
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| April 28 | Irvine, CA |
| April 29 | San Francisco, CA |
| May 13 | Houston, TX |
| May 14 | Atlanta, GA |
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| May 28 | Dallas, TX |
| June 23 | Philadelphia, PA |
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PRESENTER
**Jeff Phillips**
*TeleChoice, Inc.*

### Seminar Overview

As the technology matures to a point of mass user adoption, frame relay continues its explosive growth trend in 1998. Frame relay has proven it can deliver the increased performance and network efficiencies IT managers are looking for while at the same time decreasing their overall operations costs. In addition, carriers and equipment vendors continue to deliver the enhanced services and capabilities necessary for managers to address today's and tomorrow's application needs.

Frame Relay '98 will help you make sense of all that frame relay has become. This information-packed seminar, taught by Jeff Phillips, a frame relay expert with TeleChoice, Inc., addresses the technology from virtually every angle. In this seminar, we will explore everything from frame relay implementation fundamentals to application specifics and the many areas in between. Hot topics such as network management, voice and SNA transport, carrier and equipment vendor offerings, and interoperability will be covered in this powerful one-day session. New features and services available on the market along with their networking benefits will be addressed along with enhancements coming from industry players in the future.

Whether you are a network/telecom planner, manager, designer or administrator, Frame Relay '98 will provide you with the information and insight necessary to more efficiently and effectively implement, expand and manage your network.

### 8 Key Benefits of Attending

1. Explore the inherent benefits of using frame relay
2. Compare and contrast frame relay to other wide area networking solutions including when frame relay is a more economical solution
3. Understand the alternative approaches to running SNA applications over frame relay
4. Understand available network management options and the pros and cons of outsourcing vs. in-house network management
5. Learn how frame relay can interoperate with other networking technologies and why you may want to explore them
6. Learn how to save money by consolidating your voice and data applications over frame relay
7. Analyze the services and pricing differences between the major frame relay providers
8. Learn about new and likely future service and equipment enhancements which could prove advantageous to your networking environment

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# Your Seminar Outline

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**Frame Relay '98 Showcase**

TURN TO INSIDE BACK COVER

### 1. DECIDING TO USE FRAME RELAY SERVICES

There are many reasons that companies have decided to utilize frame relay services. We will discuss the most common reasons for using frame relay and the advantages/disadvantages for doing so.

- Business Requirements
- Typical Applications
- Frame Relay Advantages
- Performance
- Cost
- Management
- Flexibility
- Productivity
- Frame Relay Disadvantages
- Single Provider
- Conversion Costs
- Shared Network

**Case Study** — This case study shows how a private line network can be transitioned to frame relay. The benefits, such as better performance, direct connectivity, automatic restoral and others, as well as some of the disadvantages or concerns when migrating will be detailed.

### 2. CUSTOMER NETWORK COMPONENTS

Most frame relay services have common service components, although some providers do offer components unique to their service. This section defines and describes the service components and how they fit together to supply an end-to-end service.

- Node
- Tail Circuit
- UNI
- NNI
- Dial-up
- ISDN
- xDSL
- Cellular
- Satellite
- Port
- PVC
- CIR
- Customer Premise Equipment (CPE)
- Differences between Routers, FRADs, CSU/DSUs, Probes, etc.

### 3. UNDERSTANDING THE INDUSTRY JARGON

Many people misunderstand or misuse phrases and information in the marketplace. This section will help you better understand the meaning and the implications of frame relay technology.

- Frame relay "Standards"
- The components of a frame
- Oversubscription
- Bursting
- FECN/BECN
- Discard Eligible
- Cell vs. frame relay
- Network protocols

**Case Study** — Many frame relay customers today utilize frame relay for the transport of multiprotocol traffic. This case study will show a real world example of a customer using frame relay to carry its LAN and SNA traffic and discuss why frame relay was chosen.

### 4. TECHNOLOGY COMPARISON AND INTERWORKING

Many people are overwhelmed by all of the various wide area solutions available. Understanding the strengths and weaknesses of each is important in making network decisions. This section will compare frame relay to the most common competing technologies. It will also cover the concepts of network and service interworking.

- Private Line
- X.25
- SMDS
- ATM
- IP
- Network vs. Service Interworking

### 5. SERVICE PROVIDER NETWORK INFRASTRUCTURE

Before you select a frame relay service provider, you need to understand some key differences between service provider networks. Some of these differences are service affecting while others are not. This section will help you know which features are important in your decision making process.

- Switch location
- Backbone speed
- Redundancy
- NNI
- Platform
- Transport technology

**Technical Review** — For some, knowing that traffic traversing a frame relay network involves a packet, access, CPE, and a "cloud" is enough. Others would like a better understanding of how these things work. In this review we will follow the path of a packet from desktop to desktop identifying potential problems along the way.

### 6. OUTSOURCING VS. MANAGING YOUR OWN NETWORK

Some companies prefer to manage their own network using sophisticated CPE, while others look to outsource these duties to their service provider. This section details what network management options are available and when to select one over the other.

- Considerations for making the network management decision
- CPE capabilities
- Internal resources and expertise
- Price
- Service guarantees
- Service provider expertise
- Centralized vs. dispersed solutions
- In and out of cloud monitoring

**Case Study** — This case study profiles two different companies. One that decided to keep all network management responsibilities, and another that outsourced them. These case studies will show the business reasons each company chose a separate solution.

### 7. INTERNATIONAL FRAME RELAY SERVICES

Most people think that once they learn frame relay services in the United States that these services are the same internationally. This is not the case. Although service providers are starting to make services more seamless, you need to be aware of the differences.

- Owned Networks vs. Partnerships
- Pricing Differences
- Service Features

### 8. VALUE-ADDED SERVICES

Although basic frame relay services provide a beneficial solution to the networking requirements of many companies, there is often a requirement for enhanced or value-added services. These address specific customer needs and are detailed in this section.

- Native LAN Service
- Native SDLC (SNA solutions)
- Managed Network Solutions
- Customer Network Management Services
- Service Level Agreements
- Qualities of Service (QOS)

### 9. VOICE OVER FRAME RELAY

Although frame relay was originally designed as a data-specific networking solution, companies are finding that voice over frame relay continues to evolve towards the quality and cost savings they are looking for. This section details the issues involved in transmitting voice traffic over your frame relay network.

- Standards
- How It Works
- Compression
- Fragmentation & Prioritization
- Echo Cancellation
- Silence Suppression
- Advantages & Disadvantages
- Fax vs. Voice

**Case Study** — Voice over frame relay has become more mainstream. This case study profiles a company with an existing frame relay network that has decided to add its voice traffic to the network and the effects and reasons for doing so.

### 10. FUTURE GROWTH AND ENHANCEMENTS TO FRAME RELAY SERVICES AND THE IMPACT ON YOUR NETWORK

One of the most important areas you must consider when deciding whether or not to install a frame relay network is determining how or if frame relay will solve your future business requirements. This section discusses how frame relay is likely to evolve to meet future needs as your network evolves.

- Migration to ATM
- SVCs
- Multi-Link frame relay
- New access options
- Resilient NNI's

### 11. DESIGNING AND ORDERING YOUR FRAME RELAY NETWORK

When creating an RFP, or implementing a frame relay network, you must know how to design the network or at least know what information is necessary for a service provider to design the network for you. This section explains this process and highlights important areas.

- Define objectives
- Gather site information
- Map your network (Today and Future)
- Submit RFP
- How to negotiate a contract
- Transition your network to frame relay
- Common problems to avoid

### 12. UNDERSTANDING THE DIFFERENCES BETWEEN SERVICE PROVIDERS

This section profiles the major frame relay service providers and the services and features of each carrier. This will help you know which carriers have the services your company requires.

- Network
- Pricing
- Access options
- Enhanced services

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| ☐ | May 28 | Dallas, TX | Infomart |
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## About the Seminar Presenter . . .

**Jeff Phillips** is a broadband consultant and recognized industry expert with TeleChoice, Inc., one of the world's foremost authorities on telecommunications issues. In this capacity Jeff works with end users and the world's carriers and equipment providers supplying them with a wealth of experience in the deployment and marketing of domestic and international data services.

Prior to joining TeleChoice, Jeff's experience was in the cradle-to-grave management and marketing of an IXC's domestic and international data services portfolio. In addition, Jeff has in-depth experience in leading edge voice services. The combination of voice and data gives Jeff a unique insight into the industry as it moves its way towards convergence. Jeff was also instrumental in the development and launch of the industry's first on-line, real time, frame relay customer network management system which allowed end users to make their own network configuration changes.

Jeff is frequently quoted in local and national trade publications and has presented extensively on various topics pertaining to frame relay and other networking technologies and industry issues. Jeff also often contributes to various trade publications and is co-author of *Network World*'s "Broadband Ticker."

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# NetworkWorld

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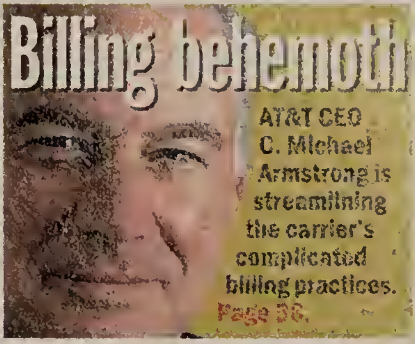

**Billing behemoth**

AT&T CEO C. Michael Armstrong is streamlining the carrier's complicated billing practices. Page 56.

## Market leaders say hands-free e-mail is close

**By Paul McNamara**

"Look, boss, no hands."

This is what e-mail administrators may soon say to their chief information officers to justify buying next-generation e-mail clients that translate speech into text for those unable or unwilling to type.

The question is: Will the CIOs, or anyone else, buy the line?

We may soon find out. Lotus Development Corp. last week confirmed that Notes 5.0, due later this year, will come bundled with IBM's ViaVoice technology,

*See* **E-mail**, *page 63*

# An imperfect DSL world

*Real-world ISP tests show even the littlest thing can disrupt DSL transmissions; AM radio is an unexpected culprit.*

**By Tim Greene**

*San Jose, Calif.*

Digital subscriber line (DSL) modems are not as fast or as stable as equipment makers would have you believe, according to one of the first real-world studies of the high-speed devices.

The study by Internet service provider Avalon Networks, Inc. shows that behind the promise of using regular copper telephone lines to support 7M bit/sec Internet access lies the reality that DSL is an immature technology susceptible to failure when faced with real network conditions.

Avalon, which is preparing a DSL-based Internet access service in Sioux City, Iowa, found that line length, circuit quality, electrical interference and even AM radio signals can reduce the top speed of asynchronous DSL (ADSL). Some of these factors can even cause connections to fail, according to the ISP.

Avalon last week shared its

*See* **DSL**, *page 64*

**UUNET forges ahead with faster nationwide DSL service at Internet World.** **Page 12.**

SPECIAL REPORT: INFOWARS

## Facts fight fiction in security circles

*How much truth is behind consultants' scare stories?*

**By Ellen Messmer**

Do you ever lie awake at night worrying that extortionists might blast your LAN with electromagnetic HERF guns, that the military is spying on your network traffic or that hackers are in league with Saddam Hussein?

There are plenty of people in government and business who do, and a whole cadre of security consultants who happily spread doom and gloom stories. These threats have even earned their own buzzword — infowar. The problem is, as the tales get bigger with each telling, separating fact from fiction can itself be "mission impossible."

Take the case of High-Energy Radio Frequency (HERF) guns.

*See* **Infowar**, *page 14*

online

- A copy of the controversial HERF/E-bomb report
- An introduction to information warfare

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# Win98: Breaking up hard to do?

**By Andy Eddy, Scott Lajoie and Sandra Gittlen**

Earlier this year Microsoft Corp. whined as a U.S. judge ordered it to unbundle Windows 95 and Internet Explorer, two products that were separate to begin with.

But what would happen if the courts or the U.S. Department of Justice forced Microsoft to rip the browser out of Windows 98? After all, this operating system is supposed to boast the ultimate in browser integration.

One thing we know is that it would be difficult for a typical user to perform such surgery on Win98. *Network World* found that Internet Explorer is not covered by either the Add/Remove Programs or the Windows Setup utilities in the Win98 beta.

But there is much more that is not known. For instance, is it even possible for a user to remove the browser? Some observers believe the browser would have to be stripped out through the command line prompt — a process they said would be no more difficult to do with Win98 than it is with Win95. "It would be simple," concluded Chris LeTocq, an analyst with Dataquest, Inc., of San Jose, Calif.

*See* **Win98**, *page 64*

**BILLGATE**

Find out how much fun Microsoft's Bill Gates had testifying last week before a Senate committee. Page 8.

AP PHOTO

# Force your ISP to measure up

*Internet performance metrics turn users into drill sergeants, riding herd on carriers*

*By* Charles Bruno

CLAY MEYER

This year, Bryan Whittle plans to force his Internet service providers to make good on their promises by employing some new weapons — a gauntlet of performance and reliability metrics.

Whittle, a general manager in Bellcore's Professional Services unit in Red Bank, N.J., oversees the mammoth Automotive Network eXchange (ANX) program for Detroit's Big Three auto makers and their legion of suppliers. ANX is a TCP/IP-based virtual private network that provides automotive trading partners with a single, secure network for electronic commerce and bulk data transfer.

*See* **ISP**, *page 47*

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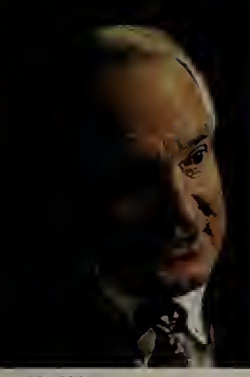
JASON GROW

## INTEL INSIGHT

Intel President Craig Barrett details the company's network product ambitions. Our interview, page 17.

## AS GOOD AS GOLD

Internet Devices wants companies to protect their network traffic with its new Fort Knox VPN products. Page 21.

## SHOPPING IN ITALY

Wang CEO Joe Tucci spends $390 million to buy Milan-based Olivetti's computer and network services business. Page 12.

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CLAY MEYER

**REVIEW:** *Slower can be better. On heavily loaded networks, switched 10M Ethernet beats its big brother, shared 100M.* Page 49.

## SPECIAL FOCUS

*Carrier evolution*

AT&T services under the new boss. Page 36.

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### This Week

### Only on Fusion

**Programmer shortage.** Real or imagined? This week, columnist Ted Young argues that industry groups are crying wolf as a way of getting government permission to import low-wage foreigners. There are ways for savvy IS managers to retain good programmers, he says. What do you think? Have you run into problems hiring people? We've set up an online forum to discuss the issue. **DocFinder: 6145**

**Keeping Current.** This week, Fred McClimans discusses the seven deadly sins of highly ineffective network managers. Not that any of our readers would ever engage in them, right? **DocFinder: 6146**

**Name that 'toon.** This is the last week to enter our first Teletoon caption contest. Think you can come up with better Teletoon captions than Frank and Troise? We've put up one of their cartoons minus the caption. The person who comes up with the best replacement wins valuable prizes (well, OK, a T-shirt, but it's a very nice T-shirt). **DocFinder: 5939**

**Ethernet.** Our online forum on larger Ethernet frames is over, but we've left all the messages up so you can still follow the debate on whether larger frames are worth the effort. **DocFinder: 5916**

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## News briefs, March 9, 1998

### Big Brown goes virtual

United Parcel Service, Inc. later this year will begin offering a new suite of electronic document delivery services called UPS Document Exchange. The offerings — Online Dossier Service and Online Courier Service — will enable customers to securely send important e-mail and files over the Internet.

### 3Com targets servers with new NICs

3Com Corp. this week will introduce a family of network interface cards (NIC) for PC servers. The cards will support Fast Ethernet, Gigabit Ethernet and token-ring LAN connections. The Application Specific Integrated Circuits in the new NICs enable automated redundancy, fault tolerance and "self-healing drivers," all aimed at keeping servers running continuously. 3Com officials said the NICs will let companies substitute lower cost PC servers for Reduced Instruction Set Computing-based boxes, without sacrificing reliability.

### Much ado about nothing

Vice President Al Gore last week was supposed to outline the administration's new plan for revitalizing its flagging electronic commerce initiative. But in a move that does not bode well for the effort's future, the National Performance Review staff did not finish preparing the plan in time for a White House ceremony celebrating the NPR's fifth anniversary. Consequently, Gore had little to say about how the government will conduct electronic commerce in the future.

### CA bugging out

At an impasse over price and fed up with "mudslinging," Computer Associates International, Inc. last week said it will let its $9 billion hostile bid for Computer Sciences Corp. (CSC) expire on March 16. CA Chairman Charles Wang also accused CSC of racism for suggesting that because he was born in China and CA President and Chief Operating Officer Sanjay Kumar was born in Sri Lanka, CA might not be able to handle CSC's sensitive government contracts. But Wang said: "It was always my impression that the real issue was the price." CSC demanded $130 per share, and then $115 to $125 per share, before resisting altogether, said Wang, whose company offered $108 per share. He added that CA is still committed to bolstering its service capabilities and will pursue other possibilities.

CREDIT: STEVE BORNS

**CA's Wang** *doesn't want to fight.*

### Lotus does office beta

Lotus Development Corp. last week announced that the next version of its office productivity suite has entered beta testing. General shipment of SmartSuite Millennium Edition is due by the end of the second quarter. New in this suite will be Lotus FastSite Web publisher, which lets users publish multiple document types directly to the 'Net or an intranet without help from a Webmaster.

### Cabletron results take a nose dive

Cabletron Systems, Inc. last week said it expects revenues for the fourth quarter of fiscal 1998 to be between $305 million and $320 million, down nearly 20% from $380.6 million for the comparable quarter in 1997.

### 3Com forced to revise earnings

A U.S. Securities and Exchange Commission review of financial documents filed by 3Com Corp. since its merger with U.S. Robotics has led the company with revise its 1997 financial results to show a smaller profit. The revision leaves 3Com with net income of $500 million compared to the previously reported $597.6 million. The company also revised its merger restructuring charge, which was estimated at $426 million when the deal closed, and now has been dropped to $270 million for the first quarter of 1998.

# Windows desktops attacked again

**By Christine Burns and Ellen Messmer**

An unknown hacker last week left thousands of Windows 95 and NT machines temporarily disabled at universities and military facilities across the country.

The perpetrator's weapon was an automated version of an existing denial-of-service attack called TearDrop. TearDrop crashes Windows 95 desktops and NT 4.0 workstations and servers by firing malformed TCP/IP-based User Datagram Protocol (UDP) packets at them. Unlike Unix machines, which discard corrupted UDP packets, NT and Windows 95 boxes get gummed up trying to diagnose them.

Victims and NT security experts said this new attack, dubbed TearDrop II, is more dangerous than its predecessor because the perpetrator has discovered a way to fire corrupt UDP packets at thousands of NT boxes at once. TearDrop attacked boxes one at a time.

In one University of Wisconsin computer lab, about 145 of the 160 NT 4.0 workstations there crashed as the result of attacks on Monday and Tuesday evenings.

In addition to crashing Windows machines, the attack also bruised Microsoft Corp.'s reputation, said Jeff Schiller, director of Massachusetts Institute of Technology's Network Services. "The only reason [the hacker] could pull this off was a flaw in Windows. That's more well-known now than it was last week," Schiller said.

Microsoft issued a patch for TearDrop in January, when reports of attacks on single machines surfaced. This patch is available at www.microsoft.com/security. Microsoft officials downplayed the TearDrop II attacks.

It is a "substantial inconvenience" to reboot hundreds of machines, conceded Edmund Muth, an NT group product manager for NT security. "But this attack is not compromising the underlying security system. And it doesn't give the hacker access to any of your data," Muth said.

Muth added that having a proper security setup in place, including firewalls and proxy servers, could prevent this type of attack. ■

**DENIAL OF SERVICE**

**According to a recent survey of 520 organizations by the Computer Security Institute, 25% of respondents were subjected to denial-of-service attacks, in which the attacker shuts down machines and cuts off network access but does not try to break into company data.**

# Xylan CEO targeted by gunman

*Steve Kim unharmed, but company steps up security.*

**By Robin Schreier Hohman**
*Calabasas, Calif.*

Xylan Corp. CEO and President Steve Kim recently had a close call, eluding a masked gunman in the company's parking lot here.

Kim said he knows of no reason why anyone would want to shoot him. He stated that the gunman said nothing to him and didn't attempt to rob him.

The Los Angeles County Sheriff's Department police officer handling the Feb. 11 incident refused to comment on the case. The officer did confirm that Kim was unharmed and said the investigation is continuing.

As Kim tells the story, he was heading to his car when the gunman approached in silence. Kim got into his car and honked the horn, scaring off the gunman and giving Kim a chance to get back out of the car and race back to Xylan's headquarters building. Before Kim got inside the building, the gunman reappeared and fired a couple of shots. Kim said the gunman then fled, allowing Kim to reach the building safely.

When asked why he didn't just drive off instead of getting out of the car, Kim said: "When that happens, you completely lose your mind. You're just so frightened."

Understandably, Kim took the next day off, but on Feb. 13 he was back to work. The only difference for Kim is that he now has two bodyguards at his side at the board's request (his wife also now has a bodyguard). And Xylan has upped security at its three-building campus, which is located in this normally peaceful suburb about 30 miles northwest of Los Angeles. The company added lights, more guards and surveillance cameras.

**A gunman shot** *at Xylan's Kim as he was walking to his car.*

Kim said the incident may have changed him personally, but it will have no effect on his running of the company or its operations. And that's a good thing considering all that's going on at the company these days.

Xylan just wrapped up a cross-country roadshow during which executives briefed analysts and reporters on the company's new OmniStack switches (*NW*, March 2, page 16).

The company also has been the subject of acquisition rumors of late, with names such as IBM and Lucent Technologies, Inc. being thrown around as interested parties. Kim denied rumors that the company is up for sale or that he wants to get out of the business.

In January, Xylan announced a stock buyback program, fueling rumors that the company was in play or in financial trouble. At the time, Xylan executives said they were buying back shares to offer as incentives to new employees, and because company officials thought the stock was undervalued. Since then, the stock has risen to the mid-$20s.

Investors have watched Xylan closely, some hoping the company might become the next Cisco Systems, Inc. The company has done well, building revenue from $30 million in 1995, the first year it shipped products, to $211 million last year. But Xylan still trails the likes of Cisco and 3Com Corp. in revenue, market share and customer mind share.

But incidents such as Kim's and the recent pie attack on Microsoft Corp. CEO Bill Gates raise questions about top executives' safety. ■

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*Circle Reader Service #***15**

# Gates takes a licking but keeps on ticking

*His counterattack at Senate committee hearing reveals some fissures in the anti-Microsoft front.*

**By David Rohde**
*Washington, D.C.*

Eighteen U.S. senators last week prepped for what may have been the hardest quiz of their lives, consisting of one multiple-choice question:

Microsoft Windows is: (a) a PC operating system foisted on the world by an evil monopoly; (b) a de facto standard that generates an amazing variety of new applications; or (c) just another temporarily popular piece of inexpensive software.

Would you believe the world's most famous computer mogul tried to convince them the correct answer is (c) — and even had a good time doing it?

Last week's Senate Judiciary Committee hearing on market power in the computer industry gave Microsoft Corp.'s bitterest rivals — Sun Microsystems, Inc. CEO Scott McNealy and Netscape Communications Corp. CEO James Barksdale — a chance to tell their tales of competitive woe.

But Microsoft chairman and CEO Bill Gates, who until recently was famous for thumbing his nose at the federal government, proclaimed the event "fun" and expressed his desire to do it again.

The hearing was more than just showtime for the bigwigs of politics and high technology. Behind the hearing was an attempt by several senators to provide cover for a possible expansion of the Department of Justice's current case against Microsoft.

The Justice Department last fall charged that Microsoft's bundling of Windows 95 and its Internet Explorer browser is an illegal tie-in, and Justice Department officials are said to be building a case that would order Microsoft to take IE out of the upcoming Windows 98 operating system (see story, page 1).

With 11 video cameras staring down the CEOs and politicians from either side of the hearing room, the Senate proceeding drew a crush of observers and worldwide attention usually reserved for impeachment hearings and other scandal-related investigations.

Confounding expectations, Gates treated the event as if he were a veteran of congressional affairs rather than the political newbie he has so recently appeared to be. He engaged in such time-tested Capitol Hill practices as entering the room ushered by his two home-state senators — Democrat Patty Murray and Republican Slade Gorton — and artfully dodged a few questions.

**Barksdale:**
***"There's nothing wrong with being a monopoly, but they have to play under a different set of rules."***

**Netscape's position:**
Microsoft has specifically targeted Netscape for elimination because Netscape's browser could provide some of the same functionality as Windows and could replace Microsoft as the company providing the key desktop interface. Microsoft has been coercing PC manufacturers, ISPs and Internet content providers to stop dealing with Netscape. The government should force Microsoft to unbundle its products.

**Gates:**
***"In the space of the term of a senator, we create a product, it becomes very popular and then it has no demand whatsoever."***

**Microsoft's position:**
Microsoft must continue to fight to remain competitive in the markets for operating systems and application software such as office productivity suites and Internet browsers. Just as Microsoft displaced IBM when distributed computing overtook mainframe computing, another commercial power could readily arise to displace Microsoft as new user demands crop up.

**McNealy:**
***"If existing laws are not enforced today, I fear that the resulting monopolization of various software markets will lead inevitably to calls for government regulation."***

**Sun's position:**
More than 95% of the PCs shipped today contain a Microsoft operating system and thus provide the gateway device for Internet access. Anticompetitive actions by Microsoft attempt to extend this monopoly to the Internet Explorer browser. Existing antitrust laws should be used to bar such product tie-ins and exclusionary licensing agreements.

### Talking shop

All of the witnesses began their testimony with valiant efforts to speak in plain English. But it was the suave McNealy rather than the gawkish Gates who most often seemed to forget where he was, playing to the tech-savvy audience rather than his questioners.

For example, McNealy wound up one impassioned attack on Microsoft with a caustic joke about Windows NT that seemed to baffle the committee. Making the connection between operating systems and human language, McNealy said the only thing that he'd like to control more than the desktop would be English, "especially if one company had the exclusive right to add new letters, such as N and T."

The remark drew guffaws from the press gallery and onlookers but blank stares from most of the senators.

Gates and his allies also managed some self-inflicted damage during the hearing. Dell Computer Corp. CEO Michael Dell tried to explain away Dell's licensing agreement requiring the company to preload the IE browser on PC shipments by saying his company offers Netscape Communications Corp.'s Navigator as a separate option, and also preloads it on bulk orders for businesses.

But those statements backfired when Judiciary Committee Chairman Orrin Hatch (R-Utah) revealed that five staffers from his office had called Dell's 800 line the previous day. All five were told flat-out that Dell does not offer Navigator.

Still, Gates and other Microsoft backers appeared to successfully depict a highly fragmented software industry consisting of small entrepreneurs who rely on Windows as nothing more than a popular platform for development.

The unexpected star of the event was Douglas Burgum, chairman and CEO of Great Plains Software, Inc., a third-party vendor of financial management software for Microsoft BackOffice. Burgum maintained that the relationship between the nation's independent software vendors (ISV) and operating system providers is by choice rather than a monopoly-driven shotgun marriage.

"Often ISVs assume the risk of choosing a platform before it's known which one will win," Burgum said. "Experience has shown that the leading platform provider today may not be the leading platform provider tomorrow," he added.

Gates seemed to score points by bringing the senators into the loop on computer-product news after McNealy began attacking Microsoft directly. "At least outside of this room, Mr. McNealy has a plan to replace PCs," Gates said. "So I don't think it's fair for Mr. McNealy to come into this room saying Java OS has no chance to replace Windows."

McNealy responded that Java OS does not have a chance if Microsoft is allowed to use Windows' installed base to dominate other markets without writing to developing standards. ■

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# Compaq gives PC servers remote access kick

**By Tim Greene**
*Houston, Texas*

Compaq Computer Corp. last week turned a few of its basic PC servers into remote access devices with the help of some modems and ISDN ports.

**Compaq** *has added dial-up access to existing Windows NT servers with the introduction of Remote Access Servers 5208 (left) and 5601.*

The new remote access boxes give companies a relatively inexpensive way to add dial-up access to their networks, and are based on a Windows NT server architecture users probably already understand. "Compaq is taking advantage of its server presence and taking advantage of Microsoft [Corp.'s] presence," said Virginia Brooks, an analyst for Aberdeen Group, Inc., a consultancy in Boston.

The $15,069 Remote Access Server 5601, based on a Compaq ProLiant 1600 server, supports a single ISDN Primary Rate Interface/T-1 card and 24 nonstandard 56K bit/sec modems based on K56flex technology. Compaq plans to upgrade to the 56K bit/sec standard, but hasn't decided if the upgrade will be free.

Moving down the scale, the $12,539 Remote Access Server 5408 supports eight ISDN basic rate interface lines to handle ISDN or modem calls.

The bottom rung Remote Access Server 5208, at $5,939, supports modems, but not ISDN. It can house up to 16 K56flex modems and also is built on a ProSignia 200 server. All servers are available now.

The new remote access servers are less expensive than some competitors' products, according to Richard Roberts, network services director for Ruppman Marketing Technologies, in Peoria, Ill. Ruppman already was using Compaq servers in its shop, and the Remote Access Server 5601 the company is buying should integrate well with the Compaq Insight Manager software the company currently is using, Roberts said.

© Compaq: (800) 652-6672

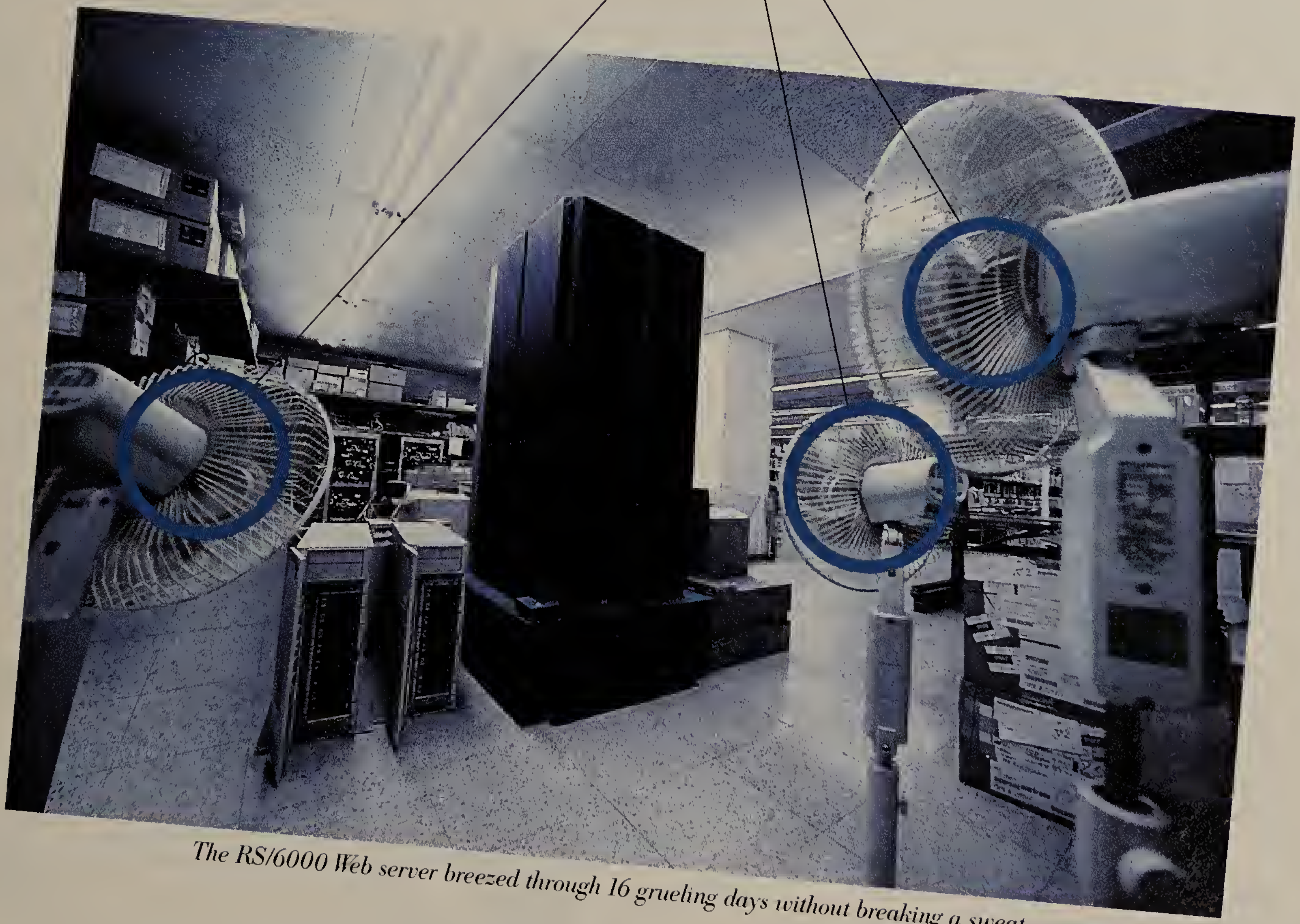
No medals.

No anthems.

No team jackets.

Just 645 million hits to the Nagano Games Official Web site.

Okay, so the IBM RS/6000 Web server did have a few fans.



*The RS/6000 Web server breezed through 16 grueling days without breaking a sweat.*

IBM's award-winning[1] UNIX® server, the RS/6000™, flawlessly powered the Nagano Games Official Web site. And even set a record of its own: handling 103,429 hits in a single minute[2]. Recently named product of the year by *InfoWorld*[3], the RS/6000 has the speed, power and endurance that can help your business compete. Prices start at just $5,900[4], so come visit us at

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[1] RS/6000 named number one Web server in *InfoWorld*, July 1997. [2] Record established on 2/20/98. [3] *InfoWorld*, February 1998. [4] Price shown is IBM suggested retail price and represents base model configurations. Actual retail price may vary. The official Web site of the Nagano Games was built, run and hosted by IBM. IBM and RS/6000 are trademarks of International Business Machines Corporation in the U.S. and/or other countries. UNIX is a registered trademark in the U.S. and other countries, licensed exclusively through X/Open Company Limited. © 1998 IBM Corp. 36 USC 380

# HP gets into service mgmt. swing

**By Jim Duffy**
*Boston*

Hewlett-Packard Co. last week pledged to become a service management market leader and backed up its words by rolling out new products aimed at helping companies tie network availability to business goals.

At the same time, HP reassured users that its venerable OpenView platform will be the foundation for IT service management (ITSM) deployment. HP's commitment to OpenView was cast into doubt last summer after the company agreed to resell rival Computer Associates International, Inc.'s management product (*NW,* July 22, 1997, page 1).

"OpenView is the strategic offering for enterprise management," said Lew Platt, HP chairman, president and CEO, at the first OpenView Universe conference here. "We're investing for the long term in making OpenView an even more powerful solution for end-to-end enterprise management."

According to HP, ITSM is the practice of establishing and measuring IT performance against business objectives. For example, a company's IT staff might guarantee SAP R/3 users a specific application response time, or service level, by reserving a certain amount of MIPS, disk space and network bandwidth. IT and corporate departments then would agree on delivery of those response-time or service guarantees for a price.

"[ITSM] is extremely important to us," Platt said. HP rolled out several new ITSM products for OpenView, including a service metric reporting tool and a monitoring tool for Internet service providers (see graphic).

### HP'S SERVE

**New OpenView service management products**

| Product | Function | Price | Availability |
|---|---|---|---|
| MeasureWare Service Reporter | Documents application response time against service-level agreements | $39 | Now |
| OpenView IT Service Manager | Enhanced help desk product fosters tighter integration with OpenView IT/Operations and Network Node Manager | $25,000 to $50,000 | Now |
| Firehunter | ISP network and service monitoring tool | $14,950 | April |
| NetMetrix | Enhanced network probe now collects statistics from E-1 and ATM networks | $5,995 | Third quarter |
| ManageX | Version 3.0 ensures 24x7 uptime for Windows NT networks | $795 to $2,995 | Now |
| AssetView | Asset management package will be integrated with OpenView portfolio | N/A | Now; Web-based this summer |
| OPNET Planner (Third-party tool from Mil 3) | Network design and simulation tool will be integrated with NetMetrix and Network Node Manager | $5,995 to $17,000 | Second half of 1998 |

HP users agreed that ITSM represents the next era of enterprise management and were encouraged by HP's aggressive stance. Users acknowledged, though, that they face formidable challenges in implementing service management.

"We do agree with [HP's] model; we need a business view" of IT management, said Sandi Potter, IT specialist at Air Products and Chemicals, Inc., in Allentown, Pa., and president of HP user group OpenView Forum International. "We've been trying to do [ITSM] ourselves, but it is difficult."

Though most users are not implementing ITSM today — HP could only cite one of its 120,000 OpenView customers as an ITSM shop — many intend to do so.

"[ITSM] really does tie IT to the business," said Paul Edmunds, senior network analyst at Duke Power Co., in Charlotte, N.C. "We have to show that we are delivering value."

In the age of ITSM, the IT manager is both service provider and intermediary between the end user and the network.

"One of our challenges is to align with business processes without . . . taking power away from [end users]," said Martin Erb, IT operations manager at Capital One Financial Corp., in Falls Church, Va. Though end users may have to give up some computing freedom when their companies adopt ITSM technology, end users will benefit from more reliable network service, Erb said.

The challenge for HP and other vendors is to deliver ITSM products that are easy to implement and cost-effective. HP's new products are a good start, but users already see some holes.

"The big thing missing in all [ITSM] products is true correlation," said Jerald Murphy, director of network management at RPM Consulting in Iselin, N.J. "I don't see any products today tying a fault in one network domain with its effect on the availability of an application. That's needed for true service-level agreements." ■

## Tivoli serves up e-commerce suite

While Hewlett-Packard Co. was throwing down its service management gauntlet, rival Tivoli Systems, Inc. was attacking another management hot spot: electronic commerce.

Tivoli last week announced Tivoli Cross-Site, a suite of management applications designed to make business-to-business electronic commerce across the Internet safer.

Tivoli claims Tivoli Cross-Site will enable businesses to manage the delivery and deployment of new applications to independent business partners over the Internet. The suite includes three applications: Tivoli Cross-Site for Availability, Tivoli Cross-Site for Security and Tivoli Cross-Site for Deployment.

Tivoli Cross-Site for Availability lets businesses manage the end-to-end performance of Internet-based electronic commerce applications unilaterally or in conjunction with business partners. Tivoli has established a partnership with Vital Signs, Inc. to make its Internet performance-analysis technology a component of Tivoli Cross-Site for Availability.

Tivoli Cross-Site for Security is designed to safeguard corporate assets and Internet-based business activities from internal and external intrusion. And Tivoli Cross-Site for Deployment allows trading partners to share data and applications.

Tivoli Cross-Site will be generally available in the third quarter of this year as either a suite or individually licensed products.

—*Jim Duffy*

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NET KNOW-IT-ALL
For the **answer** to this week's question and more net trivia, **visit Network World Fusion** and enter **2349** in the DocFinder box.

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*This week's question:*
**What's the name of the new company formed by Ray Ozzie, "the father of Lotus Notes"?**

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# Upstart eyes enterprise e-mail market

**By Paul McNamara**
*West Chester, Pa.*

What the enterprise messaging world *really* needs is an alternative to Microsoft Exchange and Lotus Notes.

At least that's the belief of executives at I/G OpenWare, Inc., who last week announced their intention to license and enhance Digital Equipment Corp.'s MailWorks and Office Server technologies. I/G's plan is to pitch its as-yet-unnamed multiplatform e-mail server to heterogeneous and Unix-based shops that do not yet use Windows NT or do not need the full capabilities of Notes.

"It's a gutsy move," said Tim Sloane, an analyst with Boston-based Aberdeen Group, Inc. "I laughed at their audacity." I/G is best known for its Direct-to-1 software that helps companies migrate to new e-mail systems.

According to I/G President Steven Martin, the company saw an opportunity in the enterprise e-mail market when Unix players such as Digital and Hewlett-Packard Co. started pushing Exchange at the expense of their own product lines.

"If you're a Unix shop, it's a hard sell to convince [you] to move to NT," Martin said. "We will give [customers] an opportunity to put e-mail on the same Unix operating system and hardware architecture that they're already running."

I/G recognizes that butting heads directly with Microsoft Corp. would likely prove futile.

"We're after the person who is not [running] a homogeneous NT shop, because if someone has decided to standardize on NT, they are probably going to go to Exchange," Martin said.

I/G's product initially will support IBM's AIX, with additional Unix flavors and an NT version to follow, he said.

Although analyst Sloane believes I/G has "some solid product" in the Digital software, he remains unconvinced that the company can thrive in a market dominated by Microsoft and Lotus Development Corp.

"The question will be their ability to get companies to consider how different their product is and for those companies to break out from the herd," Sloane said. "Herd instinct is definitely taking place right now, so most companies think [they need to go with] either Lotus or Microsoft" software or pure Internet e-mail product.

Another analyst, Mark Levitt of International Data Group in Framingham, Mass., sees the I/G initiative as a daunting one for "a relatively unknown company."

"Most of the [customers] that we talk to are moving toward NT and [are] expecting to be on NT within the next year or so," Levitt said. "There is a need for these kinds of products [that I/G will offer], but as time passes that need grows smaller and smaller."

I/G's Martin anticipates a third quarter launch for the company's new product. Beta software is expected in the next month or two. The company has yet to determine pricing.

✆I/G: (610) 241-6000

### CROSS-PLATFORM PLANS

**In developing its messaging server, I/G OpenWare eventually plans to support a variety of operating systems and e-mail clients:**

- **Operating systems:**
  IBM's AIX, Digital's Unix, Sun's Solaris, HP's HP-UX and Microsoft's Windows NT
- **Clients:**
  Microsoft's Outlook, HP's OpenMail, Lotus' Notes and cc:Mail, Digital's TeamLinks, Novell's GroupWise, and POP3 clients such as those from Netscape and Qualcomm

## CORRECTION

Due to a reporting error, Comcore Semiconductor, Inc. was misrepresented in last week's feature "The Fabless Phenomenon."

The company was incorporated last year, but grew out of a 10-year-old engineering design consultancy, GME Designs. GME designed more than 150 chips used in products including Ethernet adapters, SCSI controllers and 10/100 Ethernet switches.

Comcore is designing digital physical layer interface chips for use in LAN adapter cards, network peripherals, hubs, routers, and high-speed Ethernet switches, as well as WAN concentrators and access devices. *Network World* regrets the error.

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# Wang aiming to conquer the globe

*CEO Joe Tucci reflects on company's road back from bankruptcy.*

**By Chris Nerney**
*Billerica, Mass.*

He may not speak a word of Italian, but Wang Laboratories, Inc. CEO Joe Tucci is fluent in the language of the comeback.

Tucci returned last week from Italy, bringing with him a new name for his company — Wang Global — and a deal to buy the computer and network services subsidiary of Milan-based Olivetti SpA.

The $390 million purchase gives Wang a global presence in the white-hot network and desktop services business and — with 20,000 employees and projected revenues of $3.6 billion — a better chance to compete with huge services vendors such as IBM, Electronic Data Services, Inc. and Hewlett-Packard Co.

Wang's acquisition of Olivetti's Olsy subsidiary caps the company's remarkable rise from the ashes of bankruptcy a mere six years ago.

The primary architect of the turnaround is Tucci, a former Unisys Corp. sales executive who became Wang's CEO in January 1993.

In a phone interview from Rome, Tucci said he had been looking for a large overseas partner for awhile. "I wanted to be a global player," he said. "I put together a list, but Olivetti was always No. 1 on the list, and we went after them hard."

## Bankruptcy and beyond

In the early '90s, Wang was written off for dead. Like Digital Equipment Corp. and many other minicomputer manufacturers, Wang had missed the PC revolution. In August 1992, with losses mounting and hardware sales dwindling, Wang filed for Chapter 11 bankruptcy protection.

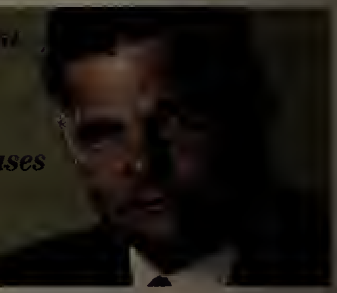
It was, seemingly, a sad end to a company, begun in 1951 by An Wang, which had rocketed up to 33,000 employees and $3 billion in revenue by the late '80s.

Wang came out of bankruptcy with a solid imaging software business and a growing network services division.

Tucci, however, recognized the growing market for network and desktop integration and services, and decided that was where Wang needed to put all of its resources. Early last year, the company sold its imaging software business to Eastman Kodak Co. for $260 million.

The deal enabled Wang to continue an aggressive acquisition strategy begun in 1994. The purchase of companies such as BISS, Dataserv, API, I-NET and Groupe Bull's North American operations provided Wang with expertise in a wide range of service areas, including help desk support, application integration and electronic commerce.

*"The perception of Wang is still as a minicomputer company that specializes in word processing. Now we're going to be a $3.6 billion service company that focuses on network-centric services."*
**Joe Tucci**, CEO, Wang Global



"Their acquisition strategy has been executed brilliantly," said Tom Wilmont, president and CEO of Aberdeen Group, Inc., a Boston-based high-tech consultancy.

"It has given them significant critical mass worldwide and provides excellent fuel for expanding," he said.

And in the network services industry, where giants roam the land, bigger is not only better, it's necessary for survival.

For example, IBM's Global Services division — Big Blue's fastest growing unit, according to Wilmont — employs 125,000 workers and pulls in $26 billion in annual revenues.

Doug Chandler, a senior analyst at International Data Corp., estimates the purchase of Olsy gives Wang Global a 5% share of the worldwide desktop and outsourcing market, not an insubstantial sum given that only IBM has a double-figure market share.

Tucci said the Olivetti deal should help Wang further distance itself from lingering perceptions of the company. People still think of Wang as a minicomputer company that specializes in word processing, Tucci said.

"Now we're going to be a $3.6 billion service company that focuses on network-centric services," he said.

Those services include network monitoring, network management, software distribution, WAN installation and NT migration — critical functions that overworked corporate IT staffs increasingly need help with, Tucci said.

"We allow corporations to free their IT staffs so they can work on their core competencies," he said. ■

### Wang's winding road

**1951:** Using $600 of his own money, An Wang starts company to make electronic business calculators.
**1976:** Company develops word processing systems for corporate offices.
**1977:** Wang introduces VS Wang computer line.
**1986:** With 30,000 employees and $3 billion in sales, Wang is at the peak of its success.
**1992:** Company files for Chapter 11 bankruptcy.
**1993:** Joe Tucci becomes new CEO. Company emerges from bankruptcy.
**1995:** Wang embarks on acquisition binge, buying BISS and Groupe Bull's North American units.
**1996:** Company acquires outsourcing and systems integration company I-NET and help desk outsourcing vendor Dataserv.
**1997:** Wang sells imaging software business to Kodak.
**1998:** Company announces plans to buy Olivetti's European-based Olsy computer services unit. Changes name to Wang Global.

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# UUNET to boost Internet access speeds

**By Denise Pappalardo**
*Los Angeles*

Dial-up Internet access users are expected to get a turbo boost at this week's Spring Internet World '98 show when UUNET Technologies, Inc. launches its latest digital subscriber line (DSL)-powered Internet access services.

The new Primary Access 384 and Primary Access 768 services will enable businesses to dial in to the Internet and nail up connections at 384K or 768K bit/sec, according to a source close to the company. UUNET would not comment.

Both services are said to be based on single-pair DSL technology from Ascend Communications, Inc. UUNET's existing Primary Access 128 service also is based on Ascend gear, but on a different flavor of DSL — ISDN DSL (IDSL), which maxes out at 128K bit/sec.

Both services fit nicely between 56K bit/sec and ISDN links, and dedicated T-1 connections, said Joel Maloff, president of Maloff Group International, a Dexter, Mich.-based consulting firm.

## Cost savings

While pricing was not available at press time, analysts speculate that users will see considerable cost savings. "The 384 service would be very attractive at $500 to $600 per month, and the 768 service would be attractive to business users at about $1,000 per month," Maloff said.

Compared with UUNET's T-1 pricing, users may save close to $1,000 per month. UUNET charges $2,750 for a T-1 port with bandwidth usage averaging between 384K and 512K bit/sec per month.

UUNET is leading the Internet service provider pack in DSL-based services, Maloff said.

UUNET will probably use existing interconnection and colocation arrangements that its sister company, MFS, established to support the IDSL service.

In order to support the SDSL Primary Access services, UUNET only needs to add an SDSL line card to its already deployed MAX TNT access concentrators. Previously UUNET had to worry about deploying and configuring the MAX TNT devices.

Primary Access 384 and Primary Access 768 users will need to deploy an Ascend DSLPipe device at their site. These devices cost between $1,150 and $1,650, for the single-port and dual-port versions, respectively. ■

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# ISPs gear up for Spring Internet World '98

Internet service providers are introducing new and enhanced services at Spring Internet World '98 this week. Here are some highlights:

- TCG CERFNET is speeding its network backbone to OC-12, or 622M bit/sec, with the help of Cisco Systems, Inc.'s 12000 GigaSwitch Routers. "We are starting in California and then moving to the northeastern U.S.," said Pushpendra Mohta, executive vice president at TCG CERFNET. The company also is expected to announce its PrimeNet service, which puts voice, Internet access, frame relay and/or ATM data service onto a single dedicated connection, Mohta said.
- Hughes Network Systems, Inc. is bundling its DirecPC satellite-based Internet service with Epoch Networks, Inc.'s Internet access service. DirecPC requires users to get Internet access from an ISP in order to connect to the satellite system.
- Sprint Corp. finally will be catching up with its ISP competitors when it comes to Web hosting. Sprint is expected to unveil its Sprint IP Web Hosting service, its first Web hosting service. The service will offer mirroring capabilities and a performance guarantee providing up to 50% credit of the monthly hosting fee if the Web site is not available at any time during the month.
- Web hosting concern Exodus Communications, Inc. is expected to introduce its Multipath disaster recovery service. Multipath lets users set up redundant Web servers at multiple locations throughout Exodus' data centers.

*—Denise Pappalardo*

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# Infowar

*Continued from page 1*

SPECIAL REPORT
INFOWARS

HERF guns are electromagnetic pulse weapons used to garble data stored on hard disks or tapes. They also can be used to temporarily disable networks by disrupting the electron flow.

Industrial nations, including the U.S., Russia and Sweden, are developing HERF guns as part of an overall infowar strategy.

And banks, for instance, are "hardening" their data facilities with shielding to prevent possible data loss by terrorists or criminals firing radio-frequency guns from a distance.

"SEV Bank in Stockholm has hardened its computer centers against HERF guns," said Manuel Wik, chief engineer and strategic specialist in the Swedish Electronic Systems Directorate. He added that a number of Swiss banks are also looking into protecting their networks.

Tales of HERF gun and other attacks abound, circulated by word-of-mouth and spread by consultants or the media.

*The Sunday Times of London* caused quite a stir in June 1996 when it reported that undisclosed "London financial institutions" paid "up to 400 million pounds" to "international gangs of cyberterrorists" using HERF guns.

The paper named the U.S. National Security Agency as the source of the information, but at the time, the NSA claimed no knowledge about it. The story was later discredited.

But the infowar crowd — a growing cottage industry — still loves a good HERF gun tale.

At last year's Infowar conference in Brussels, for example, Nicholas Chantler, professor of intelligence and security studies at Queensland University of Technology in Brisbane, Australia, claimed that an unnamed Israeli research facility one morning discovered all of its computer records wiped out — and suspected HERF guns. The story has not been independently confirmed.

Some suspect HERF guns were used against Hussein in the last Gulf War and may be used in future conflicts.

In 1991 during Operation Desert Storm, "we used non-nuclear electromagnetic pulse-tipped cruise missiles that, depending on the design, can explode above ground or on the ground to take out communications and power," said Winn Schwartau, president of Seminole, Fla.-based consultancy Security Experts, Inc., who runs the infowar.com Web site.

But could portable HERF guns be used by criminals to disrupt corporate networks, too? Yes, said Schwartau, but others are more skeptical.

"It's a genuine threat, but you can't build HERF guns from what you get at Radio Shack," said Barry Collins, senior research fellow at the Institute for Security and Intelligence. "It takes some technical prowess, but a terrorist could do it, absolutely."

Collins said that HERF guns can penetrate walls, wood and concrete, and can only be blocked by certain types of metal shielding.

While some HERF threats have been overblown, the future could be fraught with electromagnetic peril. Ira Merritt, chief of the advanced technology concepts identification and applications analysis division at the U.S. Army Space and Missile Defense Command, complained that the Internet is becoming a place to easily disseminate technical information on radio-frequency weapons.

### Learn more about infowar

**Types of weapons involved:**

- **Undirected Energy Weapons (UEW)**
  Like a lightning strike or an inadvertent man-made electromagnetic pulse transmitted through cabling wiring, UEWs cause disruptions to LANs. UEW disruptions are similar to those made by cellular phones or walkie-talkies.
- **Directed Energy Weapons (DEW)**
  Focused to hit a target, DEWs can be High-Energy Radio Frequency (HERF) or Low-Energy Radio Frequency (LERF).
- **Electromagnetic Pulse (EMP)**
  The EMP can be used to "blanket" an area and destroy all unprotected electronic equipment due to its high-voltage field.

SOURCE: "THE DIRECT THREAT OF ELECTRONIC HIGH-TECHNOLOGY WEAPONS" BY NICHOLAS CHANTLER, WITH CONTRIBUTION FROM CARLO KOPP

**Catch up on your infowar reading**

**Secret Power**
*By Nicky Hager*

**War by Other Means**
*By John Fialka*

**Information Warfare**
*By Winn Schwartau*

**At Large: The Strange Case of the World's Biggest Internet Invasion**
*By David Freedman and Charles Mann*

**Corporate Espionage**
*By Ira Winkler*

These books are available for purchase online at **www.infowar.com**

In particular, Merritt told Congress that detailed papers up at the Web site www.cs.monash.edu, attributed to Australian engineer Carlo Kopp, provided HERF gun design concepts.

"The HERF gun is eminently buildable, and this has been the case for many years now," Kopp told *Network World*. Kopp works in the systems research group at the Department of Computer Science at Monash University in Clayton, Australia. Kopp added he is not in the habit of providing the precise mathematical details to build the guns.

Even though it is difficult to confirm an actual HERF attack, experts say that caution is in order. "No one knows how susceptible commercial electronic systems might be to a concerted electronic attack," Alan Keys, a senior researcher on high-power microwave radiation at the U.S. Army Laboratories, told Congress.

## Beware of suitcases?

It might not be just guns that ultimately threaten networks. In January, the Swedish newspaper *Svenska Dagbladet* reported that the Swedish National Defense Research Institute purchased a Russian "suitcase bomb" that uses high-power microwaves to knock out computers.

"The article also reported that this device is being sold commercially and that it has been sold to the Australian military," Merritt said.

Still, it's hard to know what to believe. As an April Fool's joke in 1991, an *InfoWorld* column by John Gantz humorously said that the NSA had inserted a powerful computer virus into an Iraqi-bound printer, thereby downing the Iraqi defense network.

According to Schwartau, the story was picked up by Japanese news sources, and eventually, military officials passed it along as real news to *Nightline* and *U.S. News & World Report*. These days the Gulf War virus hoax still gets a good laugh with the infowar crowd.

## Is the NSA a threat?

Another favorite subject in infowar circles is the NSA, the Fort Meade, Md.-based spy agency known to operate a formidable array of communication-interception equipment at listening posts around the world, filtering out fax, e-mail and phone calls that might affect U.S. national security.

Within the European Parliament in Brussels, there has been growing concern about the U.S. power to intercept satellite communications via Echelon, the NSA's surveillance system that dates back to the '80s.

***"The amorphous definition of a HERF gun means that a wide range of devices qualify as HERF guns."***

**Carlo Kopp,** computer specialist, Monash University, Australia

According to *Secret Power*, a book by Nicky Hager, the largest NSA-directed satellite facility is in Menwith Hill, England, which can tap directly into the British Telecom microwave network.

The European Parliament is now reviewing a report "Assessing the Technologies of Political Control," which is said to verify the existence of Echelon.

The report claims that Echelon is "designed primarily for nonmilitary targets: governments, organizations and businesses in virtually every country."

The report goes on to say that the NSA is routinely "transferring all target information from the European mainland via the strategic hub of London, then by satellite to Fort Meade in Maryland, via the critical hub at Menwith Hill."

"The only [European Union] member state that is part of Echelon is the U.K., not any of the other countries," said Tony Bunyan, director of London-based public advocacy group StateWatch.

## Dutch treat

Another favorite subject of speculation is whether Internet hackers are in league with Iraq's Hussein.

In an assertion that has been repeated in books and broadcasts, a Dutch hacker ring called High Tech for Peace allegedly went to the Iraqi embassy in Paris during the U.S. Gulf War buildup and offered to foul up the network handling logistics messages between bases in the U.S. and the U.S. military units in Saudi Arabia.

According to John Fialka's book, *War By Other Means: Economic Espionage in America*, Hussein turned down the offer. When asked where he got this information, Fialka pointed to undisclosed military sources who told him this during the Gulf War.

BBC television aired the story, and had Dutch hackers actually stealing U.S. military secrets to sell to Hussein in March 1997, citing Eugene Schultz, former head of computer security at the Department of Energy, as the story's source.

But while no one disputes that Dutch hackers were busy breaking into Defense Department computers right before the Gulf War, there is considerable doubt as to whether they were in league with Hussein.

"This never happened," said Dutch citizen Rop Genggrijp, who said he long ago gave up his former high-profile hacker ways to operate an Amsterdam-based Internet service provider. "High Tech for Peace was not from Holland, and the story got mixed up with stories of Dutch hackers."

Amsterdam police inspector Piel Kruyer said Dutch authorities have never heard of High Tech for Peace. And a military source who was active in the Gulf War admitted that the colonel who told Fialka that High Tech for Peace was an Amsterdam group was mistaken.

## Don't try this at home

The wild stories continue to spread. Just last week, *The New York Times* ran a piece claiming that a "computer supervisor at a Midwestern engine manufacturing company" told his bosses that if he didn't get a raise immediately, he "would shut the company down" through some kind of sabotage.

The plan worked and the employee "got his raise," according to the *Times*, which cited as its source computer security consultant Erik Thompson, who "was called in to help the company."

The author of the story, columnist Peter Lewis, said he is convinced the story is real, and withheld the manufacturing firm's name because Thompson, who works for Orem, Utah-based AccessData, requested it.

In the world of infowar and security gurus, it's once again a question of "Believe it or not." ■

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DataComm MAGAZINE HOT PRODUCTS JANUARY 1997

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"MULTICAST
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Form: 9703

## 1 What is the principal business activity at your location? (check one only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consulting (Independent)*
16. ☐ Carriers/Interconnects
17. ☐ Internet Service Provider (ISP)
18. ☐ Manufacturing (Computer/Communications/OEM)
19. ☐ Resellers of Computer/Network Products (VARs, VADs)
20. ☐ Systems/Network Integrators*
21. ☐ Distributors (Computer/Communications)*
22. ☐ Other *(please specify)* ____________

***Please complete form based on largest client.**

## 2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Network Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, CIO, Systems Management
5. ☐ Internet/Intranet Management/Webmaster
6. ☐ Engineering Management
7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
8. ☐ Consultant (Independent)
9. ☐ Other *(please specify)* ____________

## 3 What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please **print** the appropriate **number code** in the box next to each product category. Please complete ALL categories A-M.)

9. $100 Million or More
0. $50 Million to $99.9 Million
2. $25 Million to $49.9 Million
3. $10 to $24.9 Million
4. $1 to $9.9 Million
5. $100,000 to $999,999
6. $50,000 to $99,999
7. Under $50,000
8. None of the above

A ☐ Large Systems *(Mainframes/Minis)*
B ☐ Desktops *(Micros/Laptops/Workstations)*
C ☐ Servers
D ☐ LANs
E ☐ WAN Equipment
F ☐ Carrier Services
G ☐ Internetworking
H ☐ Internet
I ☐ Intranet
J ☐ Remote Access
K ☐ Peripherals
L ☐ Software
M ☐ Service/Support

## 4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 2. ☐ 50 - 99 3. ☐ 20 - 49 4. ☐ 10 - 19 5. ☐ 2 - 9 6. ☐ 1 7. ☐ None

## 5 What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization? (Check one box in each column)

| SERVERS At Location A | | SERVERS Entire Org. B | CLIENTS At Location C | | CLIENTS Entire Org. D | LANS At Location E | | LANS Entire Org. F |
|---|---|---|---|---|---|---|---|---|
| ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ |
| ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ |
| ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ |
| ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ |
| ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ |
| ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ |
| ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ |
| ☐ | 8. none | ☐ | ☐ | 8. none | ☐ | ☐ | 8. none | ☐ |

## 6 What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. Involvement (check ALL that apply)
1. ☐ Create Network Strategy
2. ☐ Recommend/Specify
3. ☐ Approve
4. ☐ Evaluate
5. ☐ Determine the need
6. ☐ None

## 7 What is the estimated number of employees at your location/in entire organization? (check one in each section)

A. At your location:
1 ☐ Over 20,000
2. ☐ 10,000 - 19,999
3. ☐ 5,000 - 9,999
4. ☐ 2,500 - 4,999
5. ☐ 1,000 - 2,499
6. ☐ 500 - 999
7. ☐ 499 or less

B. Entire organization:
1. ☐ Over 20,000
2. ☐ 10,000 - 19,999
3. ☐ 5,000 - 9,999
4. ☐ 2,500 - 4,999
5. ☐ 1,000 - 2,499
6. ☐ 500 - 999
7. ☐ 499 or less

## 8 Please indicate the products/services that you are currently involved in purchasing or plan to purchase: (Check ALL that apply)

**A. Currently involved in purchasing** **B. Plan to purchase**

INTERNET/INTRANET
A B
☐ 01. ☐ Internet Services
☐ 02. ☐ Firewalls/Security/Encryption
☐ 03. ☐ Internet Web Servers
☐ 04. ☐ Intranet Web Servers
☐ 05. ☐ TCP/IP Software
☐ 06. ☐ Management/Monitoring Software
☐ 07. ☐ Push Technology
☐ 08. ☐ Web Browsers
☐ 09. ☐ Intranet Applications/Groupware
☐ 10. ☐ Search/Retrieval Products (web crawler)
☐ 11. ☐ Internet Development Tools (JAVA, ActiveX, etc.)
☐ 12. ☐ Electronic Commerce Tools
☐ 13. ☐ Internet Telephony

LOCAL-AREA NETWORKS
A B
☐ 14. ☐ Local-Area Networks
☐ 15 ☐ Network Operating System Software
☐ 16. ☐ Servers
☐ 17. ☐ Print Servers
☐ 18. ☐ ATM Switches
☐ 19. ☐ Token-Ring Switches
☐ 20. ☐ Ethernet Switches
☐ 21. ☐ Fast Ethernet
☐ 22. ☐ Gigabit Ethernet
☐ 23. ☐ IP Switches
☐ 24. ☐ LAN Storage/Backup
☐ 25. ☐ Optical LAN Storage/Backup
☐ 26. ☐ Disk LAN Storage/Backup
☐ 27. ☐ Tape LAN Storage/Backup
☐ 28. ☐ RAID LAN Storage/Backup
☐ 29. ☐ Network Test/Diagnostic Tools
☐ 30. ☐ Cables, Connectors, Baluns
☐ 31. ☐ UPS
☐ 32. ☐ Network Interface Cards
☐ 33. ☐ SNMP Network Management

INTERNETWORKING
A B
☐ 34. ☐ Routers
☐ 35. ☐ Hubs
☐ 36. ☐ Intelligent Hubs
☐ 37. ☐ Stackable Hubs
☐ 38. ☐ Bridge/Router
☐ 39. ☐ Bridges
☐ 40. ☐ Gateways
☐ 41. ☐ Concentrators/Repeaters

COMPUTERS/PERIPHERALS
A B
☐ 42. ☐ Network Computers
☐ 43 ☐ Laptops/Notebooks/Sub-Notebooks
☐ 44. ☐ Micros/PCs
☐ 45. ☐ Minis
☐ 46. ☐ Mainframes
☐ 47. ☐ Workstations
☐ 48. ☐ Printers/Network Printers
☐ 49. ☐ CD-ROM
☐ 50. ☐ Fax/Modem Boards
☐ 51. ☐ Graphics/Multimedia/Audio/Video Boards
☐ 52. ☐ Memory/Chips/Boards/Cards

REMOTE/WIRELESS COMPUTING
A B
☐ 53. ☐ Remote Access Products
☐ 54. ☐ Remote Access Services
☐ 55. ☐ PDAs
☐ 56. ☐ PCMCIA Devices
☐ 57. ☐ Wireless Data Services
☐ 58. ☐ Wireless Data Equipment
☐ 59. ☐ Cellular Equipment & Services

SOFTWARE/APPLICATIONS
A B
☐ 60. ☐ Network Management
☐ 61. ☐ Systems Management
☐ 62. ☐ Security
☐ 63. ☐ Communications Software
☐ 64. ☐ Terminal Emulation
☐ 65. ☐ Operating Systems
☐ 66. ☐ Applications Development Tools
☐ 67. ☐ Database Management/RDBMS
☐ 68. ☐ Groupware
☐ 69. ☐ Workflow
☐ 70. ☐ EDI
☐ 71. ☐ E-mail
☐ 72. ☐ Desktop Video Conferencing
☐ 73. ☐ Imaging
☐ 74. ☐ Suites/Server Suites (Back Office, etc.)
☐ 75. ☐ Middleware
☐ 76. ☐ Document Management
☐ 77. ☐ Site Metering Tools
☐ 78. ☐ Computer Telephony Integration (CTI)
☐ 79. ☐ Data Warehousing

WIDE-AREA NETWORK EQUIPMENT & SERVICES
A B
☐ 80. ☐ Modems
☐ 81. ☐ Asynchronous Transfer Mode (ATM)
☐ 82. ☐ Frame Relay Equipment/Services
☐ 83. ☐ ISDN Equipment & Services
☐ 84. ☐ FT-1/T-1/T-3 Multiplexers/Services
☐ 85. ☐ DSL Services/Products
☐ 86. ☐ SONET
☐ 87. ☐ Inverse Multiplexers
☐ 88. ☐ SMDS
☐ 89. ☐ Diagnostic/Test Equipment
☐ 90. ☐ DSU/CSU
☐ 91. ☐ VSAT/Satellite
☐ 92. ☐ PBXs
☐ 93. ☐ Voice Mail/Response
☐ 94. ☐ Videoconferencing
☐ 95. ☐ Leased Lines
☐ 96. ☐ Switched Data
☐ 97. ☐ Virtual Networks
☐ 98. ☐ Outsourcing/Systems Integration Services
☐ 99. ☐ Education/Training Services

☐ 00. ☐ None of the above (1 - 99)

## 9 Please indicate the platforms that are currently installed/planned:

(Check ALL that apply) **A. Currently installed** **B. Planned for purchase**

NETWORK PROTOCOLS
A B
☐ 01. ☐ TCP/IP
☐ 02. ☐ IPv6
☐ 03. ☐ SNA
☐ 04. ☐ DECnet
☐ 05. ☐ Novell IPX/SPX
☐ 06. ☐ APPC/APPN/LU 6.2
☐ 07. ☐ NETBIOS
☐ 08. ☐ AppleTalk
☐ 09. ☐ NFS
☐ 10. ☐ Other *(please specify)* ____________

LAN ENVIRONMENT
A B
☐ 11. ☐ Gigabit Ethernet
☐ 12. ☐ Switched Ethernet
☐ 13. ☐ Fast Ethernet (100 Megabit Ethernet)
☐ 14. ☐ Ethernet
☐ 15. ☐ ATM
☐ 16. ☐ Token Ring/Token Ring Switching
☐ 17. ☐ IP Switching
☐ 18. ☐ FDDI
☐ 19. ☐ 100Base-T
☐ 20. ☐ 10Base-T
☐ 21. ☐ LocalTalk
☐ 22. ☐ Fibre Channel
☐ 23. ☐ 100vg Any LAN
☐ 24. ☐ Other *(please specify)* ____________

NETWORK OPERATING SYSTEM
A B
☐ 25. ☐ Windows NT
☐ 26. ☐ Windows NT/Advanced Server
☐ 27. ☐ Novell IntranetWare
☐ 28. ☐ Novell (NetWare 4.X)
☐ 29. ☐ Novell (NetWare 2.X, 3.X)
☐ 30. ☐ Microsoft (LAN Manager)
☐ 31. ☐ LocalTalk (AppleTalk)
☐ 32. ☐ Banyan (VINES)
☐ 33. ☐ IBM (LAN Server)
☐ 34. ☐ Artisoft (LANtastic)
☐ 35. ☐ Other *(please specify)* ____________

COMPUTER OPERATING SYSTEM
A B
☐ 36. ☐ NT Server
☐ 37. ☐ NT Workstation
☐ 38. ☐ Unix/Xenix/AIX
☐ 39. ☐ Solaris
☐ 40. ☐ Windows
☐ 41. ☐ Windows 95
☐ 42. ☐ Windows 97
☐ 43. ☐ DOS
☐ 44. ☐ OS/2/OS/2 Warp
☐ 45. ☐ IBM MVS/VM/VSE
☐ 46. ☐ Digital VMS
☐ 47. ☐ Macintosh
☐ 48. ☐ Other *(please specify)* ____________

☐ 49. ☐ None of the above (1-48)

## 10 Which of the following Servers/Clients do you have installed/planned at your location? (check ALL that apply in each column)

| | A. Servers | | B. Clients | | A. Servers | | B. Clients |
|---|---|---|---|---|---|---|---|
| Power PC | ☐ | 01. | ☐ | 486 | ☐ | 07. | ☐ |
| Power Mac | ☐ | 02. | ☐ | 386 | ☐ | 08. | ☐ |
| Mac Other | ☐ | 03. | ☐ | 286 | ☐ | 09. | ☐ |
| Multiprocessor Servers | ☐ | 04. | ☐ | Risc | ☐ | 10. | ☐ |
| PG/Ptt | ☐ | 06. | ☐ | Alpha | ☐ | 11. | ☐ |
| Pentium/Pentium Pro | ☐ | 06. | ☐ | Other | ☐ | 12. | ☐ |

## 11 Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Mainframes (Large Scale) Installed/Planned
1. ☐ IBM
2. ☐ Amdahl
3. ☐ Cray
4. ☐ Hitachi
5. ☐ Unisys
6. ☐ Other ____________

B - Minis (Midrange) Installed/Planned
1. ☐ IBM RS6000
2. ☐ IBM AS400
3. ☐ Digital
4. ☐ Tandem
5. ☐ Unisys
6. ☐ AT&T GIS
7. ☐ H-P
8. ☐ Data General
9. ☐ Other ____________

C - Workstations Installed/Planned
1. ☐ Sun Microsystems
2. ☐ Silicon Graphics
3. ☐ Digital
4. ☐ H-P
5. ☐ IBM
6. ☐ Other ____________

## 12 What is the estimated gross annual revenue of your entire company/institution? (check one only)

01. ☐ $20 billion or more
02. ☐ $10 billion to $19.9 billion
03. ☐ $1 billion to $9.9 billion
04. ☐ $500 million to $999.9 million
05. ☐ $100 million to $499.9 million
06. ☐ $50 million to $99.9 million
07. ☐ $10 million to $49.9 million
08. ☐ $5 million to $9.9 million
09. ☐ $4.9 million or less
10. ☐ None of the above

## 13 For which areas outside of North America do you have purchase influence? (check ALL that apply)

1. ☐ Europe 2. ☐ Asia 3. ☐ South America 4. ☐ Australia 5. ☐ Middle East 6. ☐ None

B398

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# Local Networks

**Covering:** LAN Hubs, Switches and Management • Operating Systems • Servers • Thin Clients

## Briefs

**Microsoft Corp.** *has released a beta version of a* **Windows 98 add-on pack** *that will make it easier to run the yet-to-be-released operating system on corporate networks.*

*The beta for the Plus Pack for Windows 98 includes backup, disk cleanup and compression utilities, a new antivirus utility and an advanced CD player.*

*Microsoft has not yet determined how much to charge for the add-on pack.*

*© Microsoft: (425) 882-8080*

**Sun Microsystems, Inc.** *this month has begun offering a* **competitive upgrade program** *to woo users of Windows NT, NetWare and competitive Unix operating systems to Solaris 2.6.*

*Under terms of the program, customers currently using NT, OS/2, NetWare, UnixWare, Linux or other versions of Unix can purchase a copy of Solaris 2.6 as well as a two-year subscription at up to 70% off the $1,300 street price.*

*The subscription entitles users to all patches and upgrades for two years.*

*© SunSoft: (800) 786-7638*

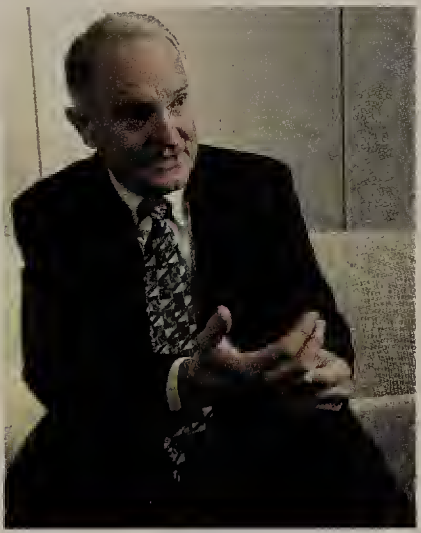
**Cisco Systems, Inc.** *and* **Microsoft Corp.** *last week announced that they will hand over the* **Directory Enabled Networks (DEN)** *specification to the Desktop Management Task Force (DMTF) for consideration as a standard.*

*Through DEN, the companies are defining a way to manage physical network devices via operating system-based directory services.*

*Cisco and Microsoft rivals — worried that DEN could be headed down a proprietary path — praised the decision to hand the specification over to the DMTF (*NW*, Feb. 16, page 1).*

## Intel president eyes bigger network role for chip maker

Intel Corp.'s network product efforts to date have focused largely on the consumer, small company and branch office markets. But with Intel's recent introduction of Layer 3 switch and Gigabit Ethernet technologies, it seems like only a matter of time before the company will start going after enterprise network customers. Intel President Craig Barrett recently shared his thoughts on the chip maker's network strategy with *Network World* Staff Writer Scott Lajoie.



**Intel already has had some success in the network industry selling hubs and network interface cards (NIC), but what's your plan to get the company taken even more seriously by network managers?**

Our main business clearly is microprocessors. What we are trying to do is develop business in and around the PC. The future of the industry is specifically visual network computing. We think we have a lot to offer. We understand computer architectures; we understand client/server architectures; we understand bandwidth requirements. We have a lot of expertise to bring to the party, and we think we can grow this into a reasonable size business.

**So far, Intel has aimed its products mainly at small sites. Will the company ever make enterprise networks a priority?**

Small businesses grow up to be big businesses. We have no intention to go after major backbone suppliers like Cisco [Systems, Inc.] at this point in time. We'll supply components into that [market]. We're cooperating with them in some areas [Intel Architecture Labs collaborates with Cisco and Microsoft Corp. on developing networked multimedia connections]. But like the rest of the computer industry, today you're friends, tomorrow you're competitors.

**How are you going to take advantage of the Intel brand to sell network products?**

You're not going to see our dancing bunnies carting around NICs, switches, hubs and routers. But clearly, if we're serious about reaching the home and small businesses, we have to reach those end users and have some direct marketing efforts.

**Intel's success in the network market to date has had a lot to do with low prices. How exactly does Intel provide lower prices on its network products?**

We have a ton of R&D and expertise in client architecture, server architecture, bandwidth requirements, buses and of course, integrated circuits.

We are reasonably good at manufacturing silicon and silicon-based products. And we're working with the rest of the industry to create specifications and then turn those specs into products.

**I'd like to ask a few questions about you now. You are being groomed to succeed [Intel CEO] Andy Grove, who was recently named *Time* magazine's Man of the Year...**

No, no, right now I have a job to do: To make sure Intel runs OK. Andy takes care of himself.

**What do you think of the celebrity-like attention being paid to some of the top high-tech executives?**

It's fun to have a little excitement and celebrity status in the industry. It makes it more real, more human. I grew up in the semiconductor industry, where 25 years ago, it was a cowboy-type atmosphere. People, however, should not get carried away every time [Oracle Corp. CEO Larry Ellison] says something, or [Microsoft CEO Bill Gates] says something, or Andy says something. ■

Go online for:
The full transcript of this interview
6121

## WebSonic readies voice-powered thin client

*Device to support voice recognition and voice-over-IP technologies.*

**By John Cox**
*Santa Clara, Calif.*

WebSonic, Inc. has begun beta-testing a thin-client computer, a device that can act on voice commands and can serve as an Internet telephone.

Later this month, the company will demonstrate its WebSonic Universal Corporate Communicator Model D5.0's voice features at the Spring '98 Voice On The Net trade show in San Jose, Calif.

Engineers are porting two software packages to the D5.0 to give the device its voice capabilities. One package contains the H.323 voice-over-IP protocol, which will let the thin client handle data and voice communications at the same time.

The other package features Dragon Systems, Inc.'s Naturally Speaking voice recognition software, which lets users enter text or give commands to the computer by speaking standard English through a microphone.

While the voice capabilities differentiate the WebSonic product from other thin clients, the device supports many basic thin-client capabilities as well.

For example, the computer can be loaded with software that lets it access Windows applications on Windows NT servers or host applications on Unix servers or mainframes. The thin client also can run a Java Virtual Machine, which lets the D5.0 download and run Java programs.

WebSonic plans to release the product in April and eventually expects to launch a battery-powered version that can be carried by hand or on a belt.

The D5.0 uses a 233-MHz StrongARM microprocessor and will come standard with 8M bytes of SDRAM and 1M byte of flash RAM. The device runs a compact, real-time operating system and supports videoconferencing, white board applications and three channels of bidirectional stereo sound.

The thin client has a 10Base-T Ethernet connection, an optional token-ring link via a PC card, two serial ports, a parallel port and an IrDA-compatible infrared port.

Pricing has not been announced.

© WebSonic: (408) 327-0250

**WIRED WINDOWS**

# Year 2000 silly season opens

I wanted to write a column on the recently agreed to Directory Enabled Network (DEN) initiative, but deadlines got in the way. By the time you read this, however, Microsoft, Cisco and a cast of dozens (including, supposedly, Netscape and Novell) should have presented a draft proposal to the Desktop Management Task Force (DMTF). Check the news on this — it could have enormous potential for networking and directories. Or maybe not. If developments warrant, I'll tackle the topic in the next week or so.

Instead, let me announce the beginning of the Year 2000 silly season. It seems that a California law firm (Milberg Weiss Bershad Hynes & Lerach LLP) has filed a class action suit over allegedly defective computer software. Surprisingly, Microsoft was not the target of the suit — Symantec and its Norton AntiVirus software were!

Milberg Weiss has a long history of class action suits on behalf of stockholders against companies the lawyers say misrepresent their financial position, but this appears to be the first lawsuit ever over the Year 2000 issue.

**Dave Kearns**

Looking closely at the case, you discover that it's not that the current Norton AntiVirus software is susceptible to the millennium bug, but that versions sold before September 1997 are. Milberg Weiss claims that many other software companies are correcting Year 2000 problems and providing patches free of charge.

That's quite true. Most vendors are providing free fixes — where needed — for their currently shipping software. But how many companies are providing software fixes for obsolete versions?

*Don't count on the court demanding that vendors offer free Year 2000 fixes for all software.*

And why antivirus software? Operating systems, database systems and financial applications all seem liable to cause much more of a problem. Could it be that Milberg Weiss, which also has an outstanding shareholder suit against Symantec, is simply looking for a way to pressure the company?

But if that is the logic, why not sue Novell for not providing Year 2000 fixes for NetWare 3.11 and 4.10 (and earlier versions)? After all, Milberg Weiss also has a stockholder suit pending against Novell, and it should be much easier to demonstrate the potential losses if a network operating system isn't Year 2000 ready.

It may be that this is only the first shot in a long legal war over the implied warranty of software.

Follow this one closely. It should be interesting to see how it plays out. But don't count on the court demanding that vendors offer free Year 2000 fixes for all software. For safety's sake, just keep plugging away on all the testing and upgrading you need to do.

*Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.*

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|---|---|---|
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A + B = C

Eventually all the communications and professional services companies will be selling you the advantages of switching from a private network to a VPN. What they will not tell you is that it's going to take you a whole network of vendors to put together the kind of VPN a large business needs to realize those advantages. Unless you're talking to Icon CMT Corp., the ISP with all the resources to actually deliver on the VPN promise.

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## Briefs

■ **Multi-Tech Systems, Inc.** *this week at Internet World is scheduled to introduce its MultiModem ZBA line of* **stand-alone modems.** *The MT5634 ZBA is a data/fax 56K bit/sec modem, and the MT5634 ZBAV is a data/fax modem that includes voice-mail software. Both modems feature call-back security. The MultiModem ZBA line begins shipping this week. The MultiModem ZBA model will cost $159 and the MultiModem ZBAV model will be $179.*

*✆ Multi-Tech: (800) 328-9717*

■ **Bay Networks, Inc.** *last week unveiled the Nautica 4000 network access server, a platform that combines* **dial access and routing** *in a single device.*

*Targeted at small to medium-size firms and branch offices, the Nautica 4000 supports simultaneous synchronous and asynchronous dial access, as well as point-to-point connections and frame relay services. The 4000 features a six-slot enclosure that currently holds up to eight ISDN Basic Rate Interfaces and 16 modems. It can also hold a single 2M bit/sec frame relay link.*

*ISDN Primary Rate Interface support and X.21, V.24/RS-232 and V.35 WAN interfaces are slated for midyear delivery.*

*The Nautica 4000 costs $4,495.*

*✆ Bay: (508) 670-8888*

■ **IBM** *has announced a new Java-based* **SNA connectivity** *product, the eNetwork Host-on-Demand Version 2 for the OS/390 mainframe operating system. With this package, browser users download Java applets from the OS/390. The applets set up a tn3270 session with an SNA mainframe. The software will let a large group of users establish sessions off a single host without requiring additional client software support, IBM said. The product is shipping now, and costs $2,500 per 500-user block.*

*✆ IBM: (800) 426-3333*

# Building VPNs as solid as Fort Knox

*Internet Devices offering turnkey virtual private network package.*

**By Tim Greene**
*Sunnyvale, Calif.*

Internet Devices, Inc. last week announced Fort Knox, a turnkey package that should make it easier for corporations to build and manage virtual private networks (VPN).

Fort Knox is a family of proprietary hardware and software VPN packages that includes firewall and encryption software for enabling secure VPNs. Fort Knox includes an e-mail server, URL blocking, spam filtering and user name/password authentication. The package also contains Web browser-based management software that lets users monitor and control the Fort Knox environment.

Fort Knox provides users with a single collection of features and services needed to set up a VPN that otherwise would have to be assembled and managed separately.

One Fort Knox box sits on the LAN side of routers linking remote sites to the Internet and corporate backbones. A second Fort Knox box at another corporate site is required to complete the secure VPN.

The Fort Knox family consists of three Intel Corp. Pentium-based models each equipped with a minimum of two 10M/100M bit/sec Ethernet ports.

The low-end Model 1000 supports a 512K bit/sec Internet connection. The mid-level Model 3000 and high-end Model 5000 add an additional Ethernet LAN port. The 3000 supports T-1 speed Internet access links, and the 5000 supports up to four T-1 lines.

Turnkey packages such as Fort Knox should become more prevalent as Internet-based VPNs become more common, according to Michael Howard, an analyst with Infonetics Research, Inc., a market research firm in San Jose, Calif.

Similar packages include Bay Networks' NOC family and products under development by start-up Indus River, Inc.

Other vendors, including VPNet Technologies, Inc., Red Creek Communications, Inc. and TimeStep Corp., include in their products some of the functions supported by Fort Knox. But none has the complete set that Fort Knox has, Howard said.

Users who have deployed Fort Knox like what they see. Bill Linhard, network manager for Delta International Machinery Corp., in Pittsburgh, only wanted a firewall, but the integrated security and other VPN features attracted him to the package.

With Fort Knox deployed at Delta's Pittsburgh site and another at the company's office in Knoxville, Tenn., the company set up a secure data link between the two, something the company never had before.

The cost of the two Fort Knox devices fell within the range Delta would have had to pay to buy and install just a pair of firewalls, Linhard said. "We didn't want to limit ourselves to a simple firewall, especially when we're looking to other features in the future," he said.

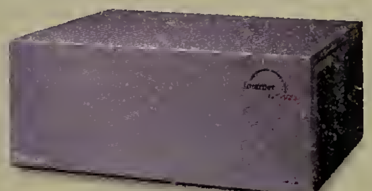
The Fort Knox 1000 with firewall costs $1,995, the 3000 costs $4,995 and the 5000 costs $9,995.

VPN software costs $995 for the 3000 and 5000. The firm's e-mail server costs $495, and the URL blocking service is available for $995. All are available now.

✆ Internet Devices: (408) 541-1406

**FORT KNOX**

**In a single box, Internet Devices' Fort Knox policy router supports:**



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# Software to ease desktop Y2K integration

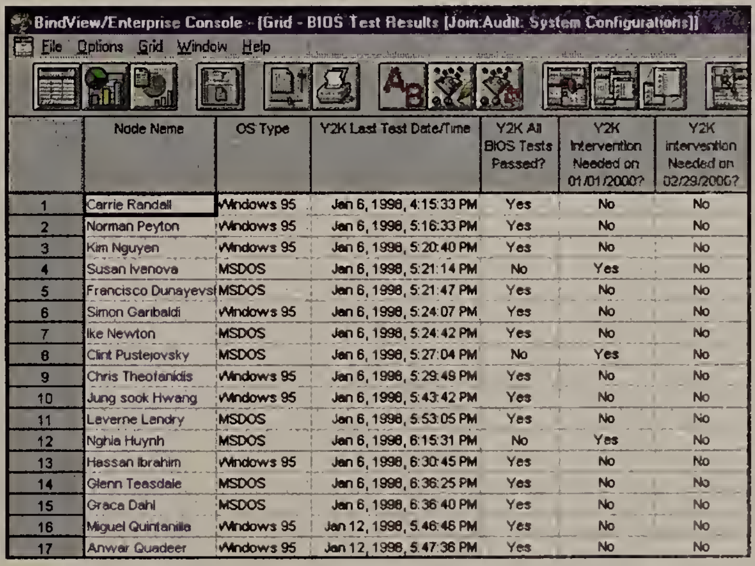
**By Jim Duffy**
*Houston*

BindView Development Corp. has enhanced its asset management software to help users prepare their desktops for Year 2000 compliance.

A new release of BindView's Netinventory software includes 16 diagnostic tests to help IS personnel find PCs in their environment that may be susceptible to Year 2000 problems. The tests determine whether a PC's real-time clock (RTC) or BIOS is compliant, or if a software patch or system replacement will be required.

While most of the focus on Year 2000 issues has been on mainframes, up to 70% of the installed PCs today are not Year 2000-compliant, according to research by Giga Information Group. Regardless of operating system or application compliance, these systems are bound to lose information or face other operational snags at the turn of the century due to problems at the BIOS level, Giga said.

Version 5.2 of Netinventory runs on DOS, OS/2, Windows 3.X, Windows 95 and Windows NT clients as well as OS/2 and NT servers. It checks more than 600 hardware parameters, including BIOS and RTC data, and more than 4,000 packaged software applications.


BindView/Enterprise Console - [Grid - BIOS Test Results [Join:Audit: System Configurations]]
File
Options
Grid
Window
Help

| | Node Name | OS Type | Y2K Last Test Date/Time | Y2K All BIOS Tests Passed? | Y2K Intervention Needed on 01/01/2000? | Y2K Intervention Needed on 02/29/2000? |
|---|---|---|---|---|---|---|
| 1 | Carrie Randall | Windows 95 | Jan 6, 1998, 4:15:33 PM | Yes | No | No |
| 2 | Norman Peyton | Windows 95 | Jan 6, 1998, 5:16:33 PM | Yes | No | No |
| 3 | Kim Nguyen | Windows 95 | Jan 6, 1998, 5:20:40 PM | Yes | No | No |
| 4 | Susan Ivanova | MSDOS | Jan 6, 1998, 5:21:14 PM | No | Yes | No |
| 5 | Francisco Dunayevs | MSDOS | Jan 6, 1998, 5:21:47 PM | Yes | No | No |
| 6 | Simon Garibaldi | Windows 95 | Jan 6, 1998, 5:24:07 PM | Yes | No | No |
| 7 | Ike Newton | MSDOS | Jan 6, 1998, 5:24:42 PM | Yes | No | No |
| 8 | Clint Pustejovsky | MSDOS | Jan 6, 1998, 5:27:04 PM | No | Yes | No |
| 9 | Chris Theofanidis | Windows 95 | Jan 6, 1998, 5:29:49 PM | Yes | No | No |
| 10 | Jung sook Hwang | Windows 95 | Jan 6, 1998, 5:43:42 PM | Yes | No | No |
| 11 | Leverne Landry | MSDOS | Jan 6, 1998, 5:53:05 PM | Yes | No | No |
| 12 | Nghia Huynh | MSDOS | Jan 6, 1998, 6:15:31 PM | No | Yes | No |
| 13 | Hassan Ibrahim | Windows 95 | Jan 6, 1998, 6:30:45 PM | Yes | No | No |
| 14 | Glenn Teasdale | MSDOS | Jan 6, 1998, 6:36:25 PM | Yes | No | No |
| 15 | Graca Dahl | MSDOS | Jan 6, 1998, 6:36:40 PM | Yes | No | No |
| 16 | Miguel Quintanilla | Windows 95 | Jan 12, 1998, 5:46:46 PM | Yes | No | No |
| 17 | Anwar Quadeer | Windows 95 | Jan 12, 1998, 5:47:36 PM | Yes | No | No |

**BindView's Netinventory** *includes diagnostic tests that help an IS manager find PCs in his network that may be susceptible to Year 2000 problems.*

In addition to the 16 RTC and BIOS tests, Netinventory has a software database that includes information from software vendors on known noncompliant software packages.

It also has a mail merge facility that puts all software manufacturers' addresses into a Microsoft Word template so users can create Year 2000 survey letters and query vendors about compliance.

BindView is not alone in addressing Year 2000 at the desktop. PinPoint Software, Inc. is now shipping ClickNet Y2K, which matches hardware and software inventory against a Year 2000 compliance database (*NW*, Jan. 26, page 12).

Netinventory is priced at $1,795 for a 100-node license and requires at least one BindView Enterprise Console, which costs $1,995.

✆ BindView: (800) 749-8439

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> *InfoWorld* FEBRUARY 2, 1998

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*Circle Reader Service* #**10**

INTERNETWORKING MONITOR

# Desktop ATM: Stone-cold dead

It was close to a year ago that I last addressed 25M bit/sec ATM to the desktop (*NW*, page 18, March 17, 1997). Frankly, I thought that would be the last time. But several e-mail messages I've received between then and now have moved me to address the topic one last time.

The e-mails — from users in the U.S., U.K. and Saudi Arabia — were frightening because in each case, the writer's company was about to embark on a deployment that called for 25M bit/sec ATM to the desktop.

Simply put, I believe that embracing such a strategy is a big mistake because desktop ATM is stone-cold dead. Don't get me wrong — I'm not knocking the technology. We tested a number of 25M bit/sec ATM switches and adapters a few years back, and they worked quite nicely. Unfortunately, this isn't about technology. It is about market momentum — or lack thereof.

Market momentum for 25M bit/sec ATM to the desktop has simply disappeared. And in this business, that is the kiss of death. Forget about the great deal your vendor wants to give you on 25M bit/sec ATM network interface cards and switches. There is good reason for the fire-sale prices. If you don't buy the desktop ATM gear, it's headed for the landfill.

There was no graceful fading away of desktop ATM because the market and user base never had a chance to develop. So few products were sold that vendors don't even have to concern themselves with charges of abandonment from their installed user base. Vendors just don't have enough reason to care.

**Kevin Tolly**

Last year when my column noted the impending demise of desktop ATM, not one campus ATM vendor wrote to object. That silence showed tacit agreement with my statements. In fact, the only responses came from xDSL vendors that stated 25M bit/sec ATM might still have a life in that realm. When vendors offer 25M bit/sec ATM, it is simply because they've already paid the development costs and have the product gathering dust on a shelf somewhere.

In all the interactions I've had with vendors over the past year — meetings at trade shows, testing projects, plowing through press releases — I have not seen one mention of any new effort directed at 25M bit/sec ATM. None.

A year ago, I noted that the only possible place for this technology to make inroads would be with token-ring users who, at the time, topped out at 16M bit/sec. Soon those users will have 100M bit/sec High-Speed Token Ring — and no need for 25M bit/sec ATM.

In 1997, the industry witnessed something of an ATM renaissance that continues today. Multiservice networks — voice over ATM is an example — that were talked about for years finally began to appear.

ATM's unique capabilities finally could be put to good use. Unfortunately, this rebirth centered around campus and WAN backbone users and did not extend to desktop ATM. So just because 25M bit/sec ATM was a good technology doesn't mean that embracing it now, even if you can get it cheaply, is a smart move.

*Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.*

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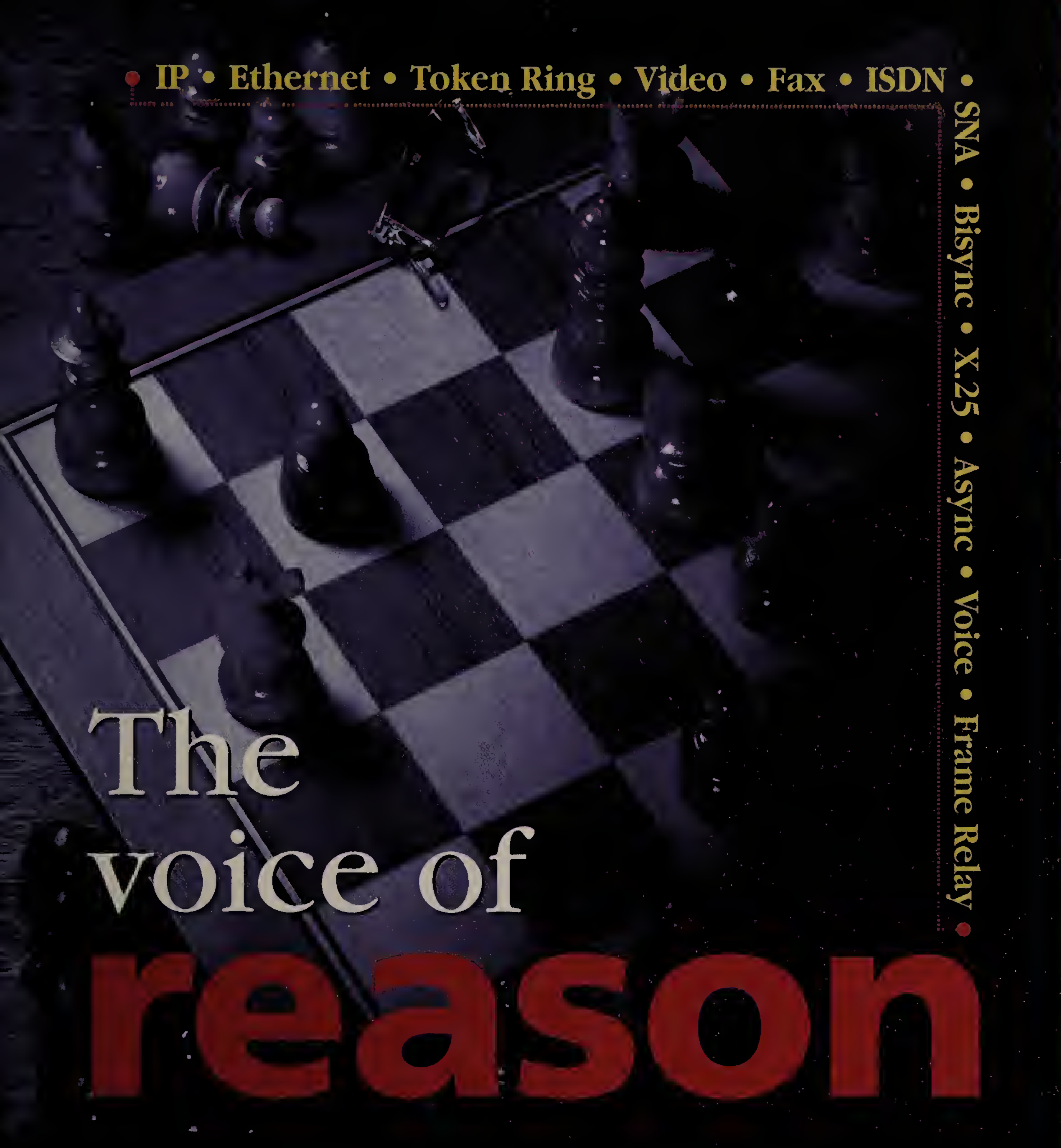

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# Carriers & ISPs

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## Briefs

**Bell Atlantic Corp.** *and* **SBC Communications, Inc.** *are separately entering the* **home entertainment market.** *Both carriers will resell DirecTV, Inc.'s direct broadcast satellite service and U.S. Satellite Broadcasting, Inc.'s pay-per-view programming. Customers will have an antenna mounted on their building, and Bell Atlantic is considering offering Internet access services over the same dish. Bell Atlantic's rollout starts this summer. SBC's service is available now.*

**Bosch Telecom Group, Inc.** *announced its first wireless product in the U.S., the* **Bosch World 718 GSM phone.** *This is the first Global System for Mobile Communications (GSM) telephone that works in international and domestic, and 900- and 1900-MHz frequencies, respectively. The phone will let international travelers use their wireless handsets whether they are in Europe or tooling around North America. While there are nearly two million Code Division Multiple Access personal communications services users domestically, GSM users are not far behind, totaling 1.5 million. Bosch World 718 is expected to be available in April for $300.*

**The Bosch World** *718 GSM phone*

*© Bosch Telecom: (800) 296-4268*

**Adtran, Inc.** *recently announced its* **Tracer Digital Spread Spectrum Radio wireless device.** *Tracer, Adtran's first wireless product, lets users support two T-1, 1.544M bit/sec links in the unlicensed 2.4-GHz spectrum. Tracer is ideal for campus nets transmitting data in a 15- to 25-mile radius. The system is available for $20,000 to $25,000 depending on configuration.*

*© Adtran: (205) 971-8000*

## Universal service charges cause a furor

*MCI wants FCC to put funding burden on local carrier, not long-distance providers.*

**By David Rohde**
*Washington, D.C.*

In a fight that's pitting long-distance carriers against the chairman of the Federal Communications Commission, the nation's new system for funding expanded universal telecommunications service is under attack.

Some long-distance carriers are filing petitions with the FCC to alter the new financing system, voted in by the FCC last May, even while the carriers are starting to pass along the charges to end users. But FCC Chairman William Kennard is battling back by demanding to know why carriers are passing along the charges at all.

At the heart of the battle is a new FCC-mandated program called E-rate, which provides discounts for Internet access and other network services to schools, libraries, rural hospitals and medical clinics.

To help pay for the program, the FCC last May voted to levy new charges on long-distance carriers that began in January.

At the time, the FCC hoped the carriers would swallow the charges because they were offset by a July 1997 $1.7 billion reduction in per-minute access fees that long-distance carriers pay local carriers.

But all of the major long-distance carriers are passing along the charges, especially to business users.

### Here come the new charges

**MCI's new monthly universal-service line charges:**

| | |
|---|---|
| Business analog phone line | **$2.75** |
| Business ISDN line | **$13.75** |
| Centrex line | **31 cents** |
| Residential line | **$1.07** |

For example, MCI Communications Corp. is "recovering" one of the new charges, called the Primary Interexchange Carrier Charge (PICC), according to the type of user access line (see graphic).

And late last month MCI filed a petition with the FCC asking it to levy the PICC charge on local carriers, such as regional Bell operating companies, instead of long-distance carriers.

In addition, the major carriers have all either levied or are preparing to levy another universal service charge. That charge is calculated as a percentage of a business user's overall interstate voice and data service. For example, AT&T's charge is 4.9% of revenues, while MCI's charge is 4.4% for large users and 5% for small users.

Some members of Congress blame the current situation on the FCC for raising universal service costs by mandating the E-rate program in the middle of telecom reform.

"Instead of deregulation, we've got taxation," said Rep. George Gekas (R-Pa.) at a recent hearing of the House Judiciary subcommittee on administrative and commercial law.

For a number of reasons, the full force of the new charges has yet to hit many enterprise network users. AT&T officials last week confirmed to *Network World* that although their new charges officially went into effect in January, many users — especially large businesses with complex voice and data contracts — have not yet seen the charges appear on their bills.

All AT&T business users who are subject to the 4.9% Universal Connectivity Charge will see it reflected on their bills by April, an AT&T spokesman said. But he warned that once the charges appear, AT&T customers will be billed retroactively since January for the charge. ■

**Get more online:**
**AT&T's reasons for passing along universal service charges to customers**
6122
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## Vendors boost IP telephony wares

**By Denise Pappalardo**
*Los Angeles*

Vendors introduced a variety of IP telephony gateways, enterprise systems and PBX calling features at last week's Computer Telephony Expo, here.

Clarent Corp. introduced an IP telephony package for virtual private network (VPN) users, VocalTec Communications, Ltd. debuted its latest IP telephony gateway and Hypercom Network Systems announced new PBX-like software for its Integrated Enterprise Network (IEN) 6000 gateway.

Computer TELEPHONY CONFERENCE 98 EXPOSITION

Clarent, like most of the IP telephony gateway vendors, is trying to figure out a way to get domestic business users to sign up for IP telephony services.

The company announced its Clarent VPN Telephony Suite. The suite is comprised of hardware and software that will allow users to add IP telephony to their existing VPN mix without the hassle of managing or deploying the equipment themselves.

Clarent is targeting service providers that want to bundle IP voice and VPN services for business users.

Clarent VPN Telephony Suite includes a scaled-down version of the Clarent Gateway, account manager and call routing software.

The Gateway sits at the customers' sites and prepares calls to be sent over their IP connections. The account manager software keeps track of who is using the Gateway. The call routing software is used to direct calls inside and outside the users' corporate IP networks.

Clarent believes users that already subscribe to IP-based VPN services would welcome the benefits of low-cost voice, especially within their corporations, said Heidi Bersin, vice president of marketing at the Redwood City, Calif.-based company.

The Clarent VPN Telephony Suite is expected to be available in June. Pricing has not been set.

Also in the IP telephony arena, VocalTec announced the Telephony Gateway Series 120. The gateway is based on Dialogic Communications Corp.'s digital signal processor board, which handles all call processing for the gateway, according to Scott Wharton, Internet telephony service provider market manager at VocalTec.

The Series 120 IP telephony gateway lets users support up to 120 simultaneous voice calls over their dedicated Internet connection. Previous VocalTec gateways maxed out at 30 calls, Wharton said.

The Telephony Gateway Series 120 is expected to be available in the second quarter. Pricing is not yet available.

Hypercom also is targeting the carrier market with its latest telephony product, IEN TotalVoice. IEN TotalVoice software runs on Hypercom's IEN 6000 gateway, which supports voice over IP, frame relay and ATM.

IEN TotalVoice software will let service providers offer their business customers PBX-like features such as call forwarding, call accounting and four-digit dialing. IEN TotalVoice is available now for $4,900.

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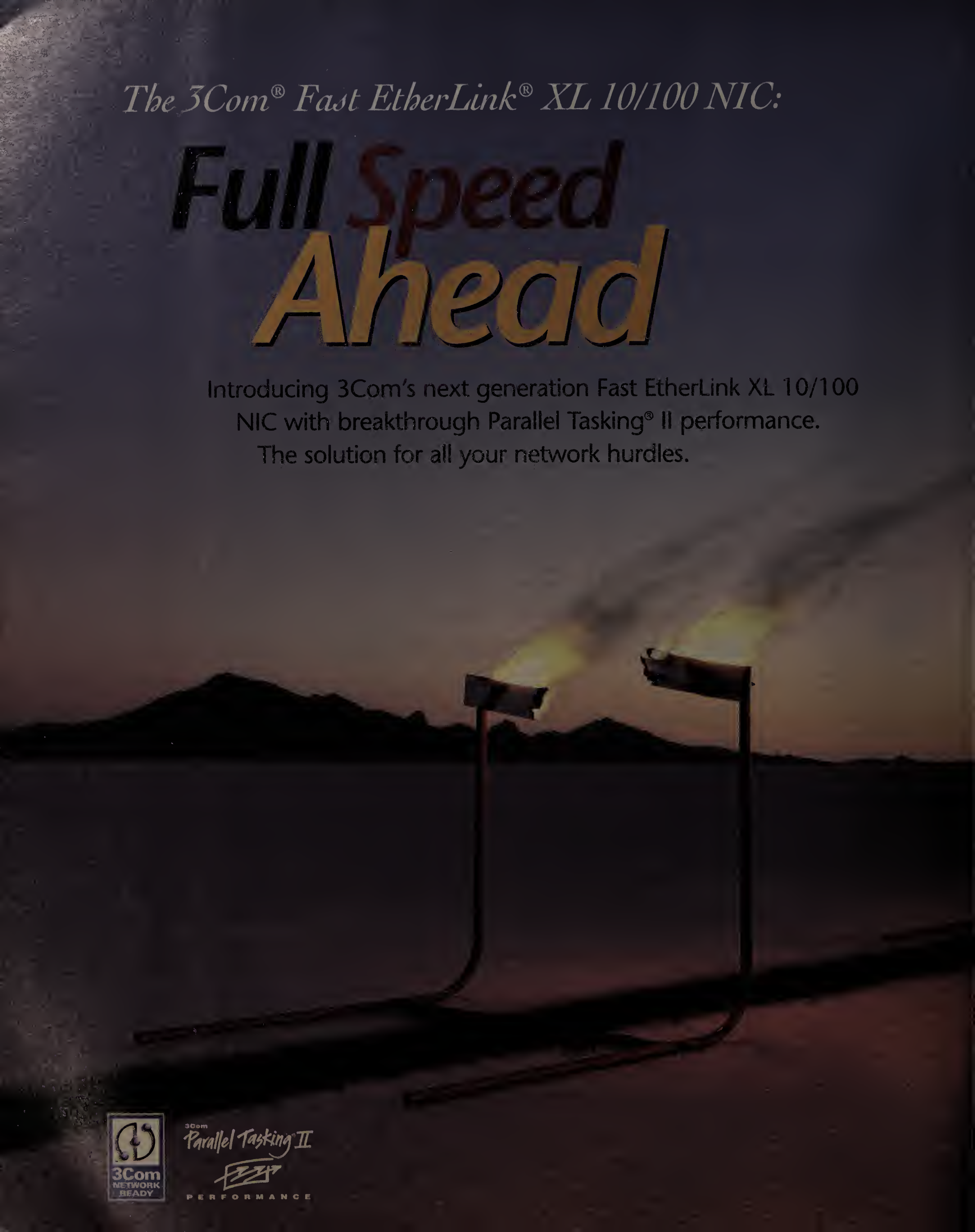

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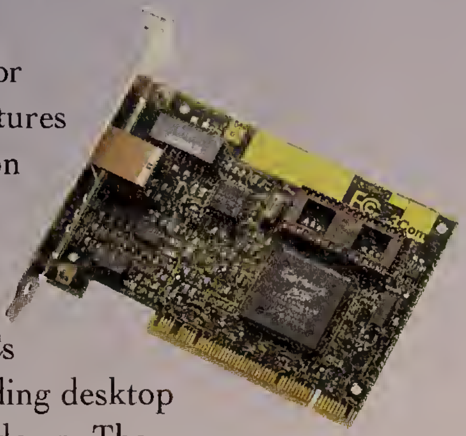

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EYE ON THE CARRIERS

# 'Net telephony: Mass potential or hobbyist toy? Depends who's asking

A couple of years ago, an economist for the Federal Communications Commission who often met with New York investment bankers noticed a fascinating phenomenon.

Whenever a carrier went to Wall Street to talk up its stock, officials would present a glowing picture of the unlimited opportunities available to the company in vast new markets.

Yet if the same carrier went before Congress or the FCC, the same officials would cite the imminent peril of their company's collapse if any legal burdens were lifted from potential competitors.

This hypocritical way of life is so ingrained within the telephone industry that there's little anyone can do about it. But you'd think the folks from new IP-based carriers who want to put voice on data networks for peanuts would be more consistent about their messages.

Don't bet on it.

Last month, the FCC called a hearing ostensibly to discuss the funding of the nation's universal service mandate. That's the system that takes a bite out of each long-distance phone call to subsidize local phone lines in rural and other high-cost areas.

But everyone in the room knew the real reason for the hearing. Senators from rural states, such as Conrad Burns (R-Mont.) and Ted Stevens (R-Alaska), are demanding that the FCC make Internet service providers contribute to universal service.

**David Rohde**

The senators reason that if Internet telephony replaces circuit-switched long distance, universal service subsidies will dry up and phone lines in their states will cost $100 or more per month. If Burns and Stevens succeed in getting ISPs to contribute in the same way long-distance carriers do, at a certain clip per minute of use, that would be the end of monthly flat-rate Internet pricing and all-day camping on the 'Net.

The FCC commissioners must tell Congress by April 10 what they're going to do about all this. That's why they called the hearing, and why — in addition to the usual dreary lineup of big corporate lawyers — they called in Jeff Pulver, chairman of the Voice On the Net (VON) Coalition.

Usually Pulver's role in panel discussions is to describe how IP telephony is going mainstream. But not in Washington, D.C. In a mile-a-minute talk in which he seemed determined to come off as an overcaffeinated technodork, Pulver painted himself as an early adopter, with two T-1 lines coming into his home to overcome the limitations of an Internet that's not ready for telephony prime time.

"Internet telephony is the ham radio of the PC," said Pulver, despite efforts by many VON Coalition members to disprove that notion. "The pickup has been on the hobbyist side." Now he tells us!

Of course, Pulver could be right in this new pose that Internet telephony isn't of much use yet. But what do you make of the IP voice services hyped by wannabe carriers?

Pulver, could, though, be wrong, and Internet telephony may be ready for takeoff. But does that really mean that ordinary telephony will collapse?

It's not clear yet what Congress and the FCC will do. But one thing is obvious: Washington's new interest in PCs and the Internet means that confusion and contradiction in computer policy is about to soar.

As a veteran Washington chronicler of the confusion and contradiction in telecom policy, all I can say is: Welcome to the club!

*Rohde is* Network World's *senior editor of Carriers & ISPs. He can be reached at david_rohde@nww.com.*

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*Carrier evolution*

# AT&T services under the new boss

*By David Rohde*

Ever so slowly, the way users negotiate for and buy services from AT&T is changing.

The arrival of C. Michael Armstrong as chairman and CEO of the telecom behemoth has accelerated the process of bringing AT&T voice and data services under one umbrella.

Despite that effort, service and support from AT&T are still fragmented, and billing platforms are still largely balkanized. AT&T continues to bill voice and private-line services on one platform, and frame relay and ATM on another.

But when it comes to purchasing the services, AT&T now is rolling almost all its key services under one contract, known as OneNet. The next time you negotiate a contract to purchase AT&T services, it very likely will be a OneNet contract. The exceptions are if you're one of the 150 or so users with a Tariff 12 deal, the original comprehensive contract that's now gone out of favor for new customers, or a smaller business with few advanced data needs.

In the early to mid-1990s, OneNet combined high-volume outbound and inbound voice services. But in 1996 and 1997, AT&T added private lines, frame relay and many other services to the bundle (see graphic).

The idea behind loading so many disparate services onto one contract is to combine the traffic volumes of each to achieve the largest possible amount. In turn, that high volume almost always generates the largest possible discount. In exchange for the price benefit, you essentially have to put your voice and data networks on parallel timing tracks.

In fact, since Armstrong arrived last November, AT&T has added its rapidly growing wireless business — cellular and personal communications services — to the OneNet package. The services are available to customers who sign up with AT&T as a national wireless account.

"We're now seeing a big shift to OneNet as customers' [existing] contracts come due," says Mike Chaplo, AT&T's director of marketing for voice services.

But insiders describe Armstrong's role as having much less to do with drawing up service bundles than with fostering conditions needed to make the bundles work against the competition.

Therefore, Armstrong's two priorities are: rapidly building out AT&T's overstrained network to handle the extra demand generated by the new supercontracts, and dramatically shaving costs to pay for the discounts.

Although he's been in office for more than five months, nearly all of Armstrong's work to cut costs is still ahead of him. Armstrong's January announcement that he will reduce AT&T's work force was greeted with some skepticism. That's because former CEO Bob Allen's work-force reduction plan, which got him on the cover of national newsmagazines in early 1996 labeled as a "Corporate Killer," didn't significantly reduce AT&T's expenses.

For example, in the fourth quarter of 1996, AT&T's selling, general and administrative expenses represented 29% of revenue. By the fourth quarter of 1997, those expenses had declined to only 28.4% of revenue. By the end of 1999, Armstrong wants to reduce those expenses to 22% of revenue.

How is he going to get there from here?

- The top 450 executives are under a pay freeze.
- Some 10,000 to 11,000 employees, largely middle managers, are getting an enriched pension incentive to leave the company.
- Approximately 5,000 to 7,000 employees will leave under what Armstrong calls "managed attrition."

### THE EXPANDING AT&T CONTRACT

**Major services included in AT&T's OneNet contract for midsize and large users:**

**Voice services:**

Software Defined Network*
Corporate calling cards
Toll-free Megacom (800 service with dedicated access)
Toll-free Readyline (800 service with switched access)

**Data services:**

Dataphone Digital Service
Private lines from fractional T-1 to full T-3*
Frame relay*
ISDN Primary Rate Interface

**Other:**

Dedicated access lines up to T-3
Digital Link local service
Audio TeleConferencing Service
Cellular and PCS wireless services

* Includes U.S.-originated portions of international services

NOTE: International private lines and domestic and international frame relay services cannot yet be included on a unified bill, though they are part of the OneNet contract.

Armstrong must then take some of the resulting savings to buy hundreds of new edge switches to take the strain off the T-1 ports on AT&T's core switches, some of which have run out of capacity (*NW*, Feb. 16, page 1).

But assuming Armstrong has enough money left over to meet his stated goal of reducing prices for end users, consultants say some new rules will apply when negotiating contracts with AT&T.

Richard Kuehn, president of RAK Associates, in Cleveland, and a long-time consultant on network services requests for proposals, points to the typical AT&T multiyear contract clause that requires users to meet a minimum annual commitment (MAC) to obtain a negotiated discount.

According to Kuehn, if AT&T prices drop, users could really be tripped up because they would have to boost their traffic volume each year simply to meet the MAC. That would occur at the very time users may wish to hand off extra traffic to new national and local carriers coming on the scene.

The solution? At least for the voice and dial-up data portion of the contract, users could ask AT&T to write the MAC in terms of minutes of traffic rather than dollars, Kuehn says. That allows users to make their commitment based on what they expect their traffic levels to be each year, without making it a guessing game of which way prices will go.

Kuehn applies a similar logic to another favorite AT&T contract clause — "monitoring conditions." These are clauses that state a user's volume must fall within certain parameters. For example, one user's contract might specify that 90% of traffic must move during peak businesses hours, while another user's contract might state 60% of traffic must travel during off-peak hours.

These monitoring conditions originated because AT&T still must file so-called contract tariffs with the Federal Communications Commission for each negotiated deal. Under tariff law, theoretically each contract tariff must be offered on demand to "similarly situated customers."

These conditions severely limit the universe of other users who can hop onto the same deal. Often these users are actually resellers looking to make a profit off AT&T negotiated discount deals.

But as traffic patterns shift, a user who meets a monitoring condition at the beginning of a three-year contract may be unable to do so at the end. A classic example, according to Kuehn, would be a user who moved fax traffic off the circuit-switched public network and onto IP networks, thus missing the MAC for a OneNet deal.

The OneNet contract offers a partial solution in this area, AT&T's Chaplo says. If users want to shift traffic between different services that are part of the service bundle, there are no penalties, because AT&T does not require subminimum MACs for each separate service.

If users want to shift traffic to a non-OneNet service such as WorldNet, AT&T will generally offer to renegotiate the contract minimums, Chaplo says. One caveat: Renegotiation generally means that the clock must start over on a new contract term.

But better news is on the horizon: By the end of 1998, even moving traffic to IP nets may not be an issue. Later this year, AT&T will add three WorldNet services — Business Dial, MIS and VPN — to the OneNet contract, Chaplo says. ■

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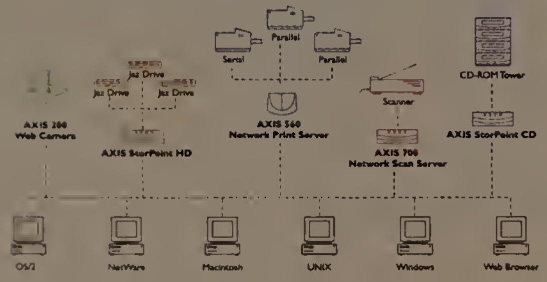

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# Intranet Applications

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## Briefs

■ *Two key middleware vendors are combining:* **Level 8 Systems, Inc.** *is acquiring* **Momentum Software Corp.** *Level 8 markets distributed middleware products, including FalconMQ, which links the Microsoft MQ messaging software with legacy systems. Level 8 has been a key player in Microsoft Corp.'s* **messaging middleware** *strategy.*

*Momentum's products are used to interconnect an array of transaction applications on different computers. The deal, a stock transaction, is scheduled to be final by the end of this month.*

■ **Accrue Software, Inc.** *last week began shipping Accrue Insight 2.0, its* **Web site analysis tool** *that can now generate reports based on a Web site's electronic commerce activities, such as volume of sales or brokerage transactions made by a Web visitor. Insight 2.0 also lets Web managers analyze user activity based on demographic data. Accrue Insight 2.0, which runs on various flavors of Unix, costs from $10,000 to over $100,000.*

*✆ Accrue: (408) 542-8900*

■ **Certicom Corp.** *today announced the Security Builder 2.0, an elliptic-curve* **cryptography tool kit.** *The kit lets software developers add encryption features based on the Microsoft Crypto APIs and the Common Data Security Architecture standard. Security Builder 2.0 is expected to ship within 90 days.*

*✆ Certicom: (650) 312-7960*

■ **Athena Design, Inc.,** *of San Francisco, has unveiled* **Web-based spreadsheet** *software based on Enterprise JavaBean technology. Integer Server IDK costs $4,999 to 14,999 per server.*

*✆ Athena: (415) 543-0783*

## Satellite 'Net access system flush with cache

**By Andy Eddy**
*Laurel, Md.*

While many companies have unveiled Web caching products in recent months, SkyCache, Inc. has taken a different approach — combining satellite access with caching intelligence.

SkyCache, founded in August 1997, uses a satellite link via a 1.2-meter dish to provide Web page delivery for a large network and to supplant the tangle of high-capacity leased lines that connect an enterprise to the Internet. A satellite connection can deliver up to 4M bit/sec — compared with a T-1 line, which can deliver only 1.544M bit/sec.

The system manages data quite innovatively, company officials claimed. SkyCache analyzes the site requests made by its customers, then employs statistical analysis to determine the most popular pages. These pages make up a "master" that is beamed by satellite to each site's local cache server.

Analysts were intrigued. "The concept of using broadcast to bypass the traditional leased line is a clever idea," said Steve Telleen, a director at Santa Clara, Calif.-based Giga Information Group, Inc. "If enough [Internet service providers] do this, it could free up the major backbones." However, Telleen argued that there is a potential downside. The advent of one-on-one marketing, such as electronic commerce sites that analyze your browsing and buying habits to offer personalized pages, conflicts with the SkyCache formula. Dynamic HTML and the forthcoming XML also may stifle this type of system.

"Down the line, as there are more dynamic, custom-built pages, the less this caching solution will have an effect beyond the first hit," Telleen said.

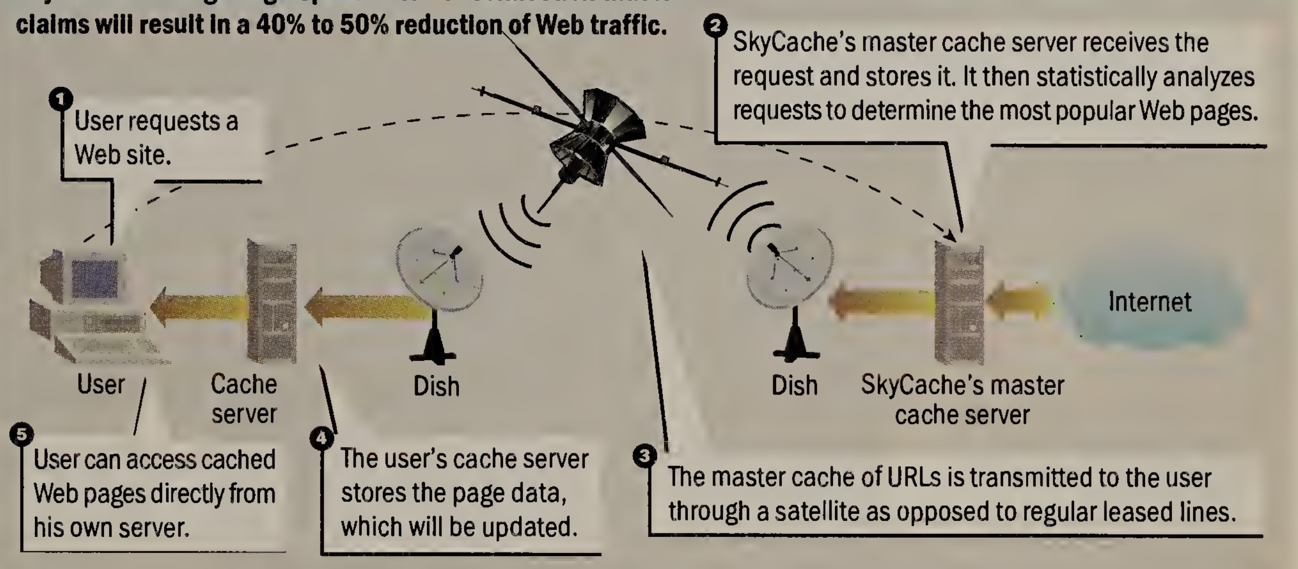
The company is initially targeting large and midsize ISPs, followed by Fortune 1000 companies. Pricing for the turnkey system is $2,500 per month, which includes the satellite dish, receiver and installation, a 16- to 20G-byte cache server and a cache adapter. A lower priced plan is available to connect the system to your existing cache technology. The plan includes the satellite dish, receiver, installation and a cache adapter.

SkyCache expects to debut the product next week at ISPCON Spring 98 in Baltimore and have it available in April.

✆ SkyCache: (301) 598-0500

### Space-age caching

**SkyCache is using a high-speed satellite connection that it claims will result in a 40% to 50% reduction of Web traffic.**


❶ User requests a Web site.
❷ SkyCache's master cache server receives the request and stores it. It then statistically analyzes requests to determine the most popular Web pages.
User
Cache server
Dish
Dish
SkyCache's master cache server
Internet
❺ User can access cached Web pages directly from his own server.
❹ The user's cache server stores the page data, which will be updated.
❸ The master cache of URLs is transmitted to the user through a satellite as opposed to regular leased lines.

## AltaVista searches for enterprise edge

*Digital to add cluster technology to popular search tool.*

**By Chris Nerney**
*Maynard, Mass.*

This July, Digital Equipment Corp.'s Internet business unit plans to release Web clustering server software based on its AltaVista search engine technology.

The AltaVista search technology is ideal for corporations that need scalability in their networks, one Digital official claimed.

Digital's confidence comes from its own experience. "The search site has gone from nothing to 33 million hits a day without ever going down," said Kelly O'Ryan, marketing vice president for Digital's Internet division. "So we've learned how to scale constantly to demand."

Web Cluster software will run on Digital Unix and Windows NT platforms. It will allow multiple servers to appear as a single server, providing automatic failover and increased security against external attacks, said Dee Stewart, Web Cluster engineering manager.

Unlike cluster technology that allows Web servers to share memory, Web Cluster is designed to let multiple Web servers share HTML processing. Thus, if a server is overloaded by HTML requests, the cluster software automatically routes the request to another server, which increases the site's ability to handle traffic, Stewart said.

Digital's AltaVista search site is one of the most popular pages on the Web. Digital's search technology is considered by many to be the most powerful and comprehensive on the Internet.

Digital last week also announced new versions of several other products based on AltaVista technology, including virtual private network (VPN) software. The new AltaVista Tunnel 98 now runs on the Windows NT/Alpha platform. The previous version supported only Windows NT/Intel and Digital Unix/Alpha, O'Ryan said.

### The choice is yours

AltaVista Tunnel 98 comes in two versions. The Telecommuter server is priced at $995. The AltaVista Tunnel 98 extranet server costs $2,495. Client software that runs on Windows 95 and Windows NT costs $99.

Tunnel's server can host up to 2,000 concurrent user connections on Digital Unix and up to 200 concurrent user connections on Windows NT.

In addition, AltaVista unveiled updated search products for intranets and non-Web systems. AltaVista Search Intranet 97B features the ability to index and query Novell and NT file shares. File shares are segments of a network server reserved for a single user or a group of users.

AltaVista Search Developer's Kit 97B is designed for non-Web-based databases and other proprietary information repositories. It includes support for Java applications.

Both 97B products run on several platforms, including Windows 95, Windows NT, Solaris and Digital Unix and will be released in May. Pricing will range from $995 to $99,995 for each.

Pricing information was unavailable for Web Cluster.

✆ Digital: (800) 344-4825

# Latitude conferencing mixes voice and data

**By Paul McNamara**
*Santa Clara, Calif.*

Users of the MeetingPlace conference server from Latitude Communications now can bolster their teleconferences by also sharing data over their PCs.

The integration of voice and data conferencing, such as that provided by Microsoft Corp.'s NetMeeting, was announced last week by Latitude.

MeetingPlace is a hardware and software server that companies install on their premises. The new version allows employees who have NetMeeting on their desktops to schedule and execute voice and data conferences themselves using only their Web browsers and telephones.

After being notified of a meeting and given a password, participants access the MeetingPlace links and instructions on their corporate intranet. The server automatically connects participants by dialing out to their telephones and connecting their PCs.

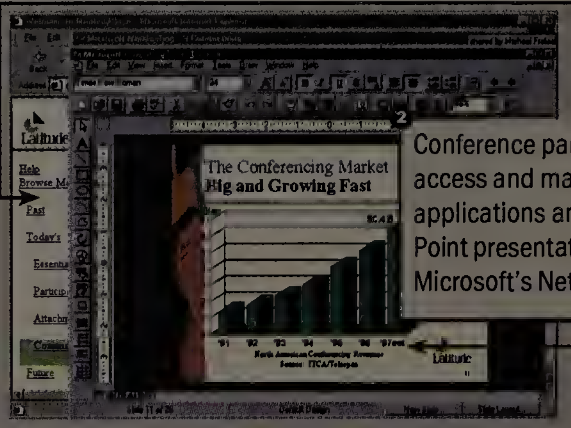
Although the basic capabilities are available from Microsoft's NetMeeting, which is included with Internet Explorer 4.0, Latitude officials claimed their product has several advantages. Running a NetMeeting data conference through MeetingPlace rather than simply between PCs prevents any one participant's PC from having host responsibilities and gives the conference firewall protection.

One MeetingPlace customer is anxious to test-drive the data conferencing capabilities. "We think that data conferencing adds a lot of value and it uses the existing [MeetingPlace] infrastructure, so the cost isn't all that high to bring it out," said Steve Prahst, a computer engineer at NASA's Lewis Research Center, in Cleveland.

The MeetingPlace server costs $39,995 for an eight-port, entry-level system. The optional data conferencing software, which runs on Windows NT, is available now at a cost of $275 per conference port. One data conference port is required for each active voice port.

©Latitude: (800) 999-7440

**PUTTING THE DATA IN MEETINGPLACE**



❶ MeetingPlace users schedule and define voice and data conferences from this browser interface.

❷ Conference participants access and manipulate applications and PowerPoint presentations using Microsoft's NetMeeting.

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*In-Site*

## File system medals on Olympic site

**By John Cox**
*Nagano, Japan*

The Web site for the XVIII Olympic Winter Games here withstood an astonishing assault from Web browsers, largely due to the Distributed File System (DFS), extensive caching and some front-end load-balancing software.

According to IBM, which built the site, 650 million hits were recorded during the 16 days of competition, more than three times the number of hits for the 1996 Olympic Summer Games in Atlanta just 18 months ago. On Friday, Feb. 20, at 9 p.m. Japan time, the hit rate reached 103,429 per minute.

DFS, a product from IBM's Transarc subsidiary, is software that makes files on multiple computers appear to be part of a single file system. In effect, DFS uncouples applications from files, so files can be changed or moved as needed without having to make changes to the applications. IBM has been using DFS in several of its high-profile Web sites, including the Atlanta Summer Olympic games site, which recorded 187 million hits.

Initially, the Atlanta site was plagued by a number of glaring glitches, but these were caused by systems linked to the Web site, not the Web site technology, IBM officials said.

At Nagano, DFS stored all static Web content — such as images, text, video and fan mail — and replicated the content on multiple back-end file servers, according to Gail Koerner, product marketing manager for Transarc's enterprise file systems group. In response to a request from a Web browser, DFS pulled out numerous files to be presented in a single Web page.

IBM ran the DFS client software on several Web servers to handle the high volume of requests and to improve performance. DFS also stored the most frequently requested pages on the Web server. This storage, or caching, cut the response time for users. This faster response time also meant the Web servers could cope with the high traffic.

"Caching relieves the nets and back-end servers of excessive utilization: that's why we can scale so well," claimed Jon Stumpf, infrastructure consulting manager with Transarc. ■

**Get more online:**
Technical overviews of the IBM systems used in Nagano and Atlanta
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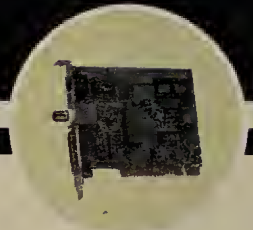

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NET INSIDER

# The 'Net as Fantasy Island

Press reports late last month said President Clinton called for the Internet to be a tax-free zone. But if you take a look at the speech itself (www.whitehouse.gov), it does not quite say that.

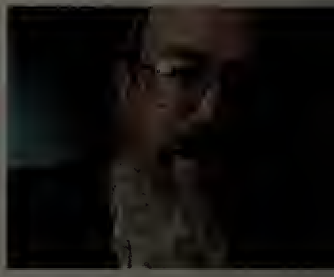
In the speech, given at a San Francisco technology conference, the president called for a "moratorium on discriminatory taxation" on the Internet. Specifically, he expressed support for H.R. 1054 and S. 442, the Internet Tax Freedom Act bills now being considered by the House of Representatives and Senate (http://thomas.loc.gov). The bills — the House and Senate versions are the same — deal with two semirelated issues: taxes and regulations.

The legislation calls for treating commerce over the Internet the same as all commerce executed remotely — for example, by telephone or mail. So if you buy a microwave oven via the 'Net, you are not protected from whatever taxes would be imposed if you bought the same oven from a mail order catalog.

The legislation also would outlaw taxes or fees imposed, directly or indirectly, on interactive computer services or the Internet or on the use of interactive computer services or the Internet. Finally, the legislation calls on the president to make sure the rest of the world exercises the same restraint about taxing the Internet.

Somewhat orthogonally, the legislation also would remove from the Federal Communications Commission or any state regulatory commission all authority to regulate the prices or subscriber fees charged by providers of interactive computer services or information services delivered through the Internet. The exceptions would be cases where the purchaser is a rural health care provider, a school or a library.

Note that this does not extend to Internet service providers themselves. So in theory, the FCC could determine what access fee UUNET charges customers even if the commission could not regulate what AOL charges.



**Scott Bradner**

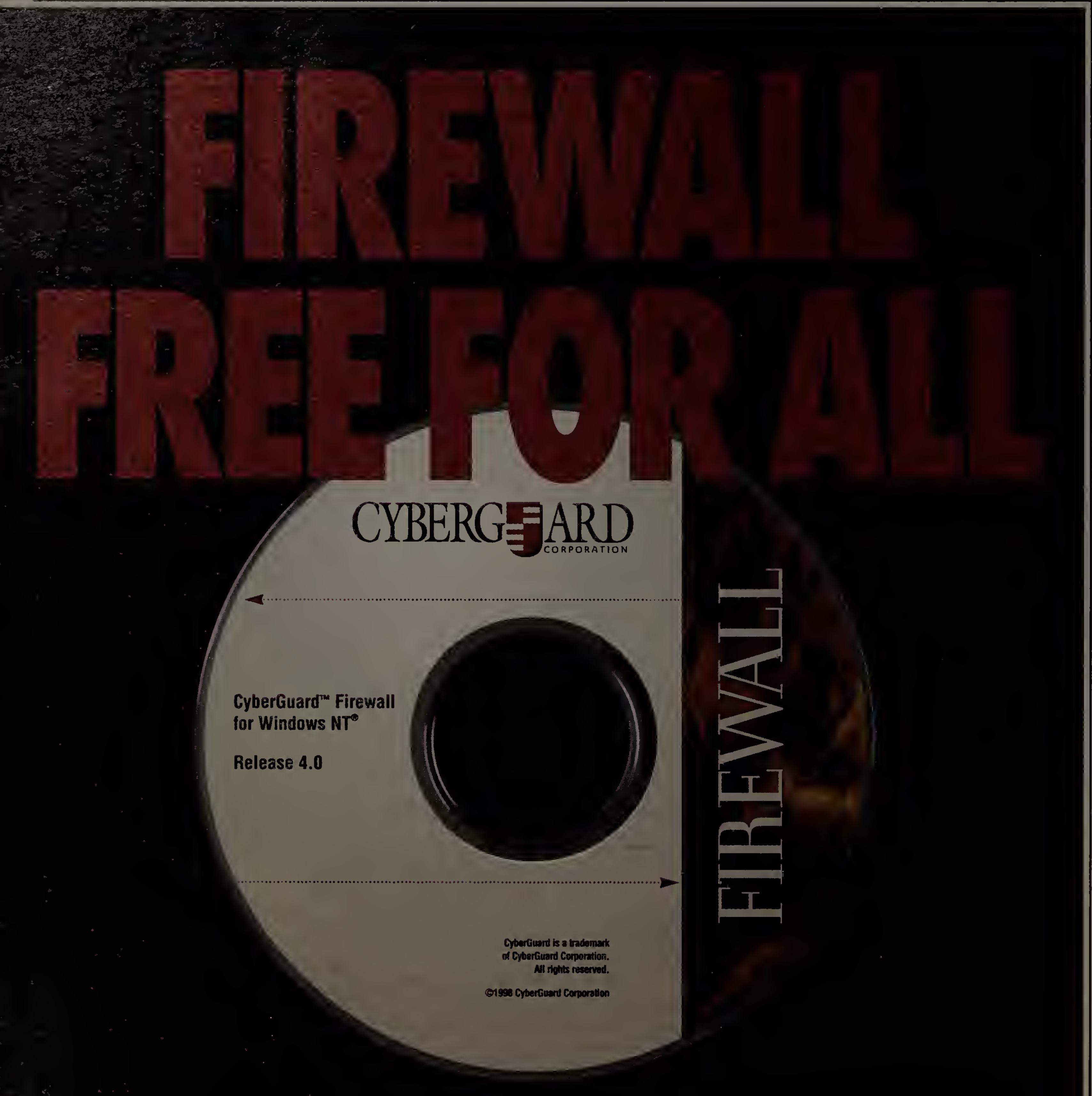
This is good stuff, but it falls way short of what some of the press stories implied and what many Internet fans would like to see — a tax-free Internet. That is, an Internet where you would not pay sales tax for that microwave oven. But such an Internet environment just ain't gonna happen — not with estimates like the president's of more than $300 billion in electronic commerce by 2002 floating around.

Still, the idea of such an Internet is very attractive to many people. They cite the difficulty of dealing with the 30,000 separate authorities with the power to impose taxes in the U.S. alone. It is also reasonable to note that taxing mail order sales has been less than universally successful. But despite these problems, there is no way that these taxing authorities can afford to see their revenues cut as commerce moves to the Internet.

The misunderstanding of these proposals does fit right into an all-too-common view of the Internet as being on some plane disconnected from the real world, a plane that can avoid the power of governments. Maybe that is the plane that Tattoo saw at the beginning of each episode of "Fantasy Island."

Disclaimer: Harvard does not have a clinical psychology program, so this study of fantasy is my own.

*Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.*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# Technology Update

**Covering:** Evolving Technologies and Standards

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**I have a problem with Windows NT 4.0 workstations failing to read the container logon scripts consistently. The workstations are running Microsoft Corp's. Client for NetWare and are linked to two NetWare 4.10 servers and one IntranetWare 4.11 server.**

**The problem is not specific to one container, nor does it appear to be a rights issue, as many of the computers dual-boot to either NT or DOS. When in DOS, the drive mappings are received correctly, and if the workstations are rebooted enough times, they will correctly read the scripts eventually. I have installed the latest patches on all servers and am looking for additional suggestions.**

**Via the Internet**

The scenario you describe might indicate a bus-timing problem between the network cards and the motherboard they plug in to. To check this, simply switch cards. If you are using a PCI bus card, for example, try an ISA bus card. I suggest sticking with a name-brand card from a company such as Compaq Computer Corp. or 3Com Corp.

It also would be worthwhile to try the network cards in different slots in the motherboard, because the timing issue could be slot-related. Also, check to see if you've got the latest drivers for the cards.

If the problem persists, you can look at a client software solution. To see if the version of the NT client you are using from Novell, Inc. is the problem, try installing Client Services for NetWare on the NT workstation. If this can consistently log on to the NetWare 4.X servers and correctly execute the logon scripts, it might indicate some type of configuration issue between the NT server and client. If you prefer not using Client Services for NetWare, try downloading a copy of IntranetWare Client for NT Version 5, available at support.novell.com/beta/public/index.htm. You also might try applying Service Pack 3 to your NT systems.

# Supporting real-time traffic over the Internet

*Real-time Transport Protocol ensures prompt delivery of voice, video and data.*

**By William Stallings**

As the Internet and private intranets grow in scale, a host of new demands will be placed upon them.

Low-volume telnet conversations have been leapfrogged by high-volume client/server applications. Web traffic has grown increasingly graphics-intensive. And real-time voice and video applications now are adding to the burden.

To cope with these demands, it is not enough to increase Internet capacity. Sensible and effective methods for managing traffic and controlling congestion are needed. An important new standard that addresses this need is the Real-time Transport Protocol (RTP). RTP, a standards-track protocol defined in RFC 1889, provides time-stamping and other mechanisms needed to support real-time traffic.

### Generating streams

In a real-time distributed application, a source generates a stream of data at a constant rate, and one or more destinations must deliver that data to an application at the same constant rate. Examples of such applications include audio- and videoconferencing, live video distribution (not for storage, but for immediate play), shared work spaces, remote medical diagnosis, telephony, command and control systems, distributed interactive simulations, games and real-time monitoring.

In a typical real-time environment, a source generates packets to be transmitted at a constant speed. Thus, packets are issued at uniform time intervals. These packets are passed through the Internet and delivered to a destination, which reproduces the data in real time as it arrives.

However, because of the variable delay imposed by the Internet, the arrival times among packets are not constant. To compensate for this, the incoming packets are buffered, delayed slightly and then released at a constant rate to the software that generates the output. For this scheme to work, each packet must be time-stamped so the receiver can play back the incoming data with the same timing used by the source.

RTP supports the transfer of real-time data among a number of participants in a session. A session is simply a logical association among two or more RTP entities that is maintained for the duration of the data transfer. The process of setting up a session is beyond the scope of the standard.

### Multicast transmissions

Although RTP can be used for unicast real-time transmission, its strength lies in its ability to support multicast transmission. For this purpose, each RTP data unit includes a source identifier that determines which member of the group generated the data. Each unit also includes a time stamp so the proper timing can be re-created on the receiving end using a delay buffer. RTP also identifies the payload format of the data being transmitted.

Part of the RTP specification is the definition of two RTP relay functions: mixer and translator. A mixer is an RTP relay that receives streams of RTP packets from one or more sources, combines these streams and forwards a new RTP packet stream to one or more destinations. The mixer may change the data format or simply perform the mixing function.

Because the timing among the multiple inputs is not typically synchronized, the mixer provides the timing information in the combined packet stream and identifies itself as the source of synchronization.

One way to use a mixer is to combine a number of audio sources. Suppose that a number of systems are members of an audio session and each generates its own RTP stream. Most of the time, only one source is active, although occasionally more than one source will be "speaking" at the same time.

A new system may wish to join the session, but its link to the network may not be of sufficient capacity to carry all of the RTP streams. Instead, a mixer could receive all of the RTP streams, combine them into a single stream and retransmit that stream to the new session member. The RTP header generated by the mixer includes the identifiers of the sources that contributed to the data in each packet.

### Need a translator?

A translator is a simpler device that produces one outgoing RTP packet for each incoming RTP packet. The translator may change the format of the packet's data or use a different lower level protocol suite to transfer from one domain to another. For example, a potential recipient may not be able to handle a high-speed video signal used by the other participants. The translator converts the video to a lower quality format requiring a lower data rate.

To meet the demands of increased volume and real-time applications, Internets need new tools. RTP provides a solid foundation for the next generation of Internets.

*Stallings is an author, consultant and lecturer on data communications and computer networking topics. This article is based on material in his most recent book,* High-Speed Networks: TCP/IP and ATM Design Principles, *published by Prentice-Hall. His home in cyberspace is www.shore.net/ws and he can be reached at ws@shore.net.*

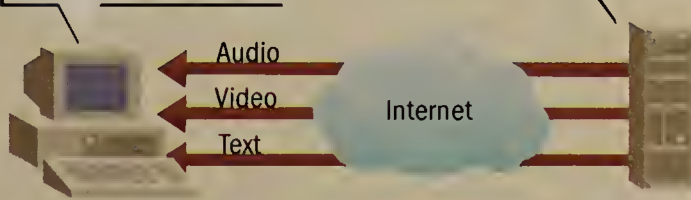
## HOW IT WORKS

### Using the Real-time Transport Protocol

The Real-time Transport Protocol (RTP) compensates for the variable delays faced by voice, video and data application traffic when traveling over the Internet. RTP does not address resource reservation and does not guarantee quality-of-service for real-time applications.

**1** Client makes a request for a voice/video application and the download of a corresponding text document.

**2** Server begins sending requested data, and RTP provides timestamps and other coordinating mechanisms for voice, video and data streams to ensure delivery to the client at a constant rate.



Client using RTP

Multimedia server using RTP

**3** RTP software on client reads and buffers incoming RTP-based streams to ensure that the user can play back the incoming data with the same timing used by the server.

## Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Michael Cooney by phone at (508) 875-6400 or e-mail at michael_cooney@nww.com.

EDITORIAL *insights*

## A challenge to the thin-client vendors

Last month, I told you about the "Thin Client Face-off" debate we'll be staging at the upcoming NetWorld+Interop show. Now, after talking with readers, analysts and vendors, we've chosen the companies that will be showcased in this special event.

We're challenging Microsoft, IBM, Sun, Network Computer (an Oracle subsidiary), Wyse Technology and Neoware to send a CEO or top technical executive to take part. These vendors have until Wednesday, March 18, to confirm their participation in the Face-off, which will be held from 10:30 a.m. to noon on Tuesday, May 5, in Las Vegas.

If any of the vendors declines or misses the deadline, we'll challenge one of the other players in the thin-client market. But, so far, no company has refused to take part in one of our debates. This is our fourth such event. We've also held debates among Gigabit Ethernet and switching vendors, as well as network and systems management companies.

During this Face-off, the vendor executives will first answer questions from a panel of experts. Our panelists will be John Cox, a *Network World* senior editor with plenty of experience covering the thin-client beat; Eileen O'Brien, director of the Enterprise NC program at market research firm International Data Corp.; and Nicholas Petreley, editor in chief of *NC World*, an online publication covering the market. (By the way, if you haven't found *NC World* on the Web, you should look it up at www.ncworldmag.com. It's a great resource.)

After the experts fire away, our vendor panelists will ask each other questions. Finally, the audience will get to grill the suppliers. There are no formal presentations and there's a strict time limit on answers. The format is designed to cut down on marketing blather and help prospective thin-client buyers like you understand the real differences in vendor strategies and the issues shaping the market.

For our challenge, we've tried to pick companies that represent different views on the thin-client market — from backers of Java-based network computers to those pushing Windows-based terminals. Clearly, these aren't the only important players, but we can only accommodate six vendors on stage.

Choosing participants is a highly subjective process, but after researching the companies and talking with experts, we felt these companies represented a good cross section of market leaders and opinion shapers.

Now two things remain. First, we need your ideas on what to ask the companies. What worries you about thin clients?

Second, we need to hear back from the vendors. So, IBM, NCI, Neoware, Wyse, Microsoft and Sun, are you up to the challenge?

***John Gallant, editor in chief*** jgallant@nww.com

*Java Break* • *Ted M. Young*

# Training, not workers, is in short supply

Lately, a variety of news organizations, from *The New York Times* to CNN to CNET's news.com, have featured reports on the apparent shortage of programmers. This blitz is the result of a well-executed publicity campaign from the Information Technology Association of America (ITAA), whose members are producers and consumers of IT products and services, such as Oracle Corp., Microsoft Corp. and General Motors Corp.

The ITAA claims there are hundreds of thousands of IT job vacancies in the U.S. As a result, there appears to be a bidding war going on for good development talent.

But if you look past the press releases to the ITAA's real agenda, you'll see the group's intent is to get the government to relax restrictions on the immigration of temporary programmers from abroad. That way companies can hire foreign talent at lower wages than they'd have to pay U.S. workers.

Interestingly, the American Engineering Association (AEA) contradicts the ITAA's claim about the shortage of programmers. According to the AEA, a shortage would mean there is no one available to fill a vacancy. (For more information, go to www.aea.org/aea/.) In reality, wage escalation is the problem: Employers simply are not willing to pay what programmers are asking, or they're too picky about the skills required. Companies would rather leave positions open than hire programmers who may require training in specific areas.

In other words, you get what you pay for. If you want to hire someone who has experience in a specific high-demand area, such as Java or SAP R/3, you have to pay for it.

On the other hand, paying top dollar for development talent isn't always the best solution. Hunger for more money can tempt programmers to jump from one company to another. A much more effective solution is to make better use of the talent you have through effective training and mentoring.

As the co-founder of a company that does training and mentoring exclusively in the Java area, I see a lot of just-in-time training going on, or, sadly, no training at all. Too many companies employ the trial-by-fire method of throwing programmers into the fray and hoping they'll survive long enough to make it through a project. When you have to scramble to get people up to speed on a project that starts in mere weeks, you pay in many ways for not preparing those involved: decreased quality, slipped schedules, lower productivity, increased costs and higher staff turnover.

Just as you wouldn't expect an Olympic-class performance from a figure skater who skated all day and night without proper coaching and training, you can't expect high productivity and quality from your development staff working on a Java, Web or electronic commerce project if you don't prepare and guide them properly.

For training to be truly successful, help must be available during the development project itself. Whether it's mentoring, where an experienced developer can guide the staff through the mistakes others have made, or access to existing knowledge through Web site discussion areas and e-mail lists, there must be some source that can provide answers to the questions that will arise. Nothing is more wasteful than a developer spending three days to figure out a solution to a problem that could have been answered in 10 minutes by an experienced consultant or in a few hours on an active-discussion Web site or e-mail list.

If you're reluctant to hire new programmers at the market rate, take the money you'd spend on a new hire and put it toward training, mentoring and other services to make your staff more productive. You'll be amazed at what happens to morale and productivity when your developers feel like they're cared for.

*Young is chief technology officer at Advanced Web Technologies Corp., a Java training and mentoring firm in New York. He can be reached at (212) 487-9064 or at tyoung@javatrain.com.*

## MESSAGE QUEUE

*Send letters to nwnews@nww.com or John Gallant, editor in chief,* Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

### Another view of OpenView

Your article "HP's service management silence is deafening" (Feb. 16, page 17) incorrectly identifies Paul Edmunds as the president of OpenView Forum user group. I am, in fact, the current president of OpenView Forum International.

I also would like to protest your handling of this and other articles related to OpenView, because the information presented in these articles is almost always biased against Hewlett-Packard. This particular article couldn't be mor blatant in its attempt to negatively influence industry reaction to the OpenView Universe meeting in Boston

# Why buy a van when a pickup will do?

Nothing sparks a good media debate like the prospect of making money. A prime example is the recent debate about just what is needed to make gigabit server technology work.

We've heard that Windows NT isn't efficient in gigabit network applications — or maybe it is. We've heard pro and con arguments about Alteon's proposal to reduce software handling overhead in gigabit servers by creating larger Ethernet packets. Maybe we should first consider how important gigabit speed really is for servers and in what applications it might be useful.

First, don't feel culturally disadvantaged if your network is lacking in gigabit network server technology. According to a survey of more than 200 users that my organization conducted in October, the average NT server supports only a 10M bit/sec access connection, less than 30% of which it actually uses. Even users with 100M bit/sec Ethernet or FDDI connections to servers report an average utilization of less than 10M bit/sec; the upper 5% of NT servers averages only 30M bit/sec utilization.

If you want a half-ton truck, you don't get all uptight because the model you want doesn't come in a 10-ton version, right? The truth is most servers have an installed life of less than three years. At the current rate of growth for server bandwidth requirements, about half of today's servers will be obsolete before even 100M bit/sec connections are required. But don't get cocky, either. You might be one of the network administrators who is hit with a server bandwidth shortage, so it's probably prudent to look at the reasons for paying careful attention to server performance.

Servers handle communications messages, such as requests for transaction processing or Web pages, through a combination of operating system software and application software. If it takes a lot of CPU cycles to fulfill each request, the result could be an overloaded server processor and performance limitations. Generally, operating systems designed for performance-intensive transaction processing applications have enhancements for minimizing the handling of communications messages. It's true that Windows NT wasn't especially optimized this way, but neither was Unix. Some Unix-based computer vendors, such as Tandem, now part of Compaq, have customized their Unix versions to make them more suitable for high-performance network applications. Thus, there's every reason to believe that if we were to press NT into service at the high end of the transaction-processing game, Microsoft might have to provide performance enhancements.

In theory, increasing the packet size might help because the total resources a server application consumes in message handling equals the per-message resource requirements multiplied by the number of messages. If the application allows for larger packet size, the same amount of information can be passed between client and server, or vice versa, with fewer messages.

But many applications, particularly transaction-processing applications, have a message size that's based on the transaction, and today's average transaction is only about 780 bytes long — already shorter than the standard Ethernet frame. Bigger frames won't help these applications. In short, if gigabit transaction processing is really a requirement, we might face changes to NT to support it efficiently.

Also, some new applications may increase the chances that gigabit-level server performance will be required. Microsoft and other companies are developing architectures to permit the development of true distributed database and distributed computing applications. Because these applications would inject network and server delay into the data flows within an application, and not just between applications, any performance limitations in the network or operating system would be magnified.

There's also a small but growing trend to cluster servers in interconnected complexes that can perform disk mirroring and hot standby. These clusters create a kind of virtual server whose performance will depend in part on how fast messages or disk blocks can be read and written between cluster members. Microsoft's Wolfpack initiative is targeted at providing operating system support for clustering and encouraging effective network hardware connectivity through a flexible set of software interfaces. All of this is intended to make high-availability server complexes more interesting as an alternative to mainframes or minicomputers. Server-to-server communications of this type have their own virtual device interfaces to the operating system, and these interfaces already are capable of higher performance. Channel architectures such as Fibre Channel or High Performance Parallel Interface could be viewed as alternatives to traditional LAN technology for cluster applications, given the fact that client systems don't participate in intracluster communications.

While there certainly are trends that might stress NT, and even Ethernet, in server applications in the future, there also are questions about whether standard communications middleware and network hardware will even play a role in many of these future applications. So it all comes down to the half-ton truck analogy: If you really expect to do interstate hauling, it may not be best for you. On the other hand, there are a lot more half-tons on the road than moving vans. NT and Ethernet are still the right answer for most of us, now and in the future.

*Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or tnolle@cimicorp.com.*

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where HP announced it would address the very questions asked in the article — namely, what is HP doing about service management, and what benefits has the OpenView community seen from the Prolin acquisition? I hope subsequent articles have a more balanced treatment of the subject.

*Sandra Potter*
*President*
*OpenView Forum International*
*Allentown, Pa.*

## I want my PDF

Regarding Mark Gibbs' column "Into the Information Age . . . without PDF" (Feb. 16, page 58):

I suppose Gibbs has never talked to mathematicians and others struggling to find ways to present technical material on the Web. We are between the rock of aesthetically offensive kludges based on bitmap formats and the hard place of slick but immature Java concoctions that require a supercomputer to work at an acceptable speed. Right now PDF is a very good solution.

*Eric Behr*
*Northern Illinois University,*
*Mathematical Sciences*
*DeKalb, Ill.*

One reason for PDF is vendors sometimes do not want customers changing a document. In the case of product specifications or other critical data, changes could be significant. A misplaced decimal point or other intentional or unintentional changes could cause problems.

*Don Sterling*
*Senior copy director*
*Godfrey Advertising*
*Lancaster, Pa.*

Mark Gibbs challenged readers to document a compelling need for document fidelity. I have one.

As a Realtor, I am regulated by the Texas Real Estate Commission (TREC), which provides forms to use in creating contracts for transfer of real estate. TREC levies fines for variations in form layout. This requirement is due to the amount of fax transmissions that a contract might see before being finalized. By maintaining control of the text, Realtors have only to worry about how the blanks are filled in — after six or eight transmissions, you can no longer read the fine print. But we can see the exact location of all changes and amendments.

Use of PDF enables us to control content and layout and saves many days during the negotiation of contracts.

*George Webster*
*Realtor*
*Century 21 Accent 1 Realtors*
*Allen, Texas*

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SALES

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# Force your ISP to measure up

*Continued from page 1*

Last December, ANX began piloting an initiative, called ANX Release 1, in which ISPs will vie for certification that will allow them to serve ANX partners. To qualify, service providers must meet more than 100 performance and reliability metrics specified by ANX.

"One of the key business drivers is accountability," Whittle says. "We aim to hold service providers accountable by giving them very specific performance goals to meet." Bellcore, ANX partners and, to some extent, service providers, will regularly measure the performance and reliability of the carriers' TCP/IP networks.

While ANX may not strictly govern Internet performance, it stands as a model for network managers to adapt similar principles to their own ISP relationships.

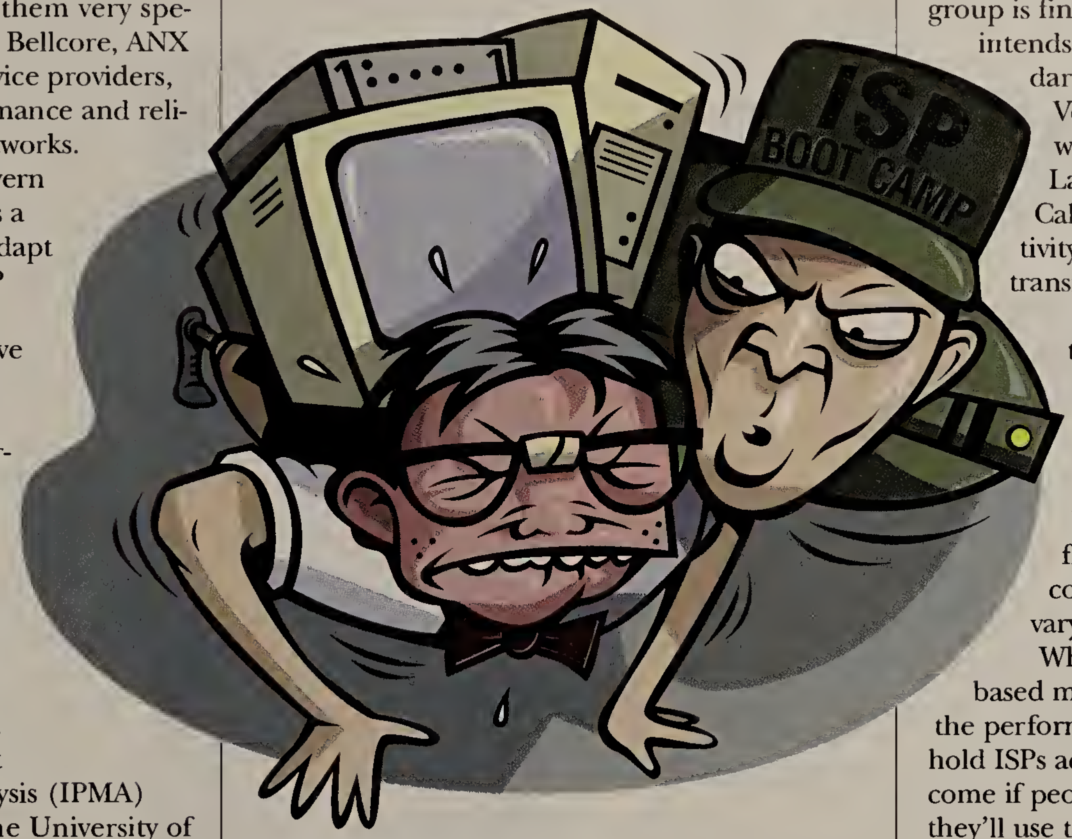
The brainchild of the Automotive Industry Action Group, the ANX Release 1 program is perhaps the most aggressive user-backed performance measurement effort to date. However, the Internet Engineering Task Force (IETF) and research institutions have embarked on other efforts to provide the standards, tools and infrastructure necessary to measure the effectiveness and reliability of ISPs.

One such effort is the Internet Performance Measurement Analysis (IPMA) project, a partnership between the University of Michigan and Merit Networks, Inc. to build a collection of probes, analysis engines and visualization tools for measuring the performance and stability of the Internet.

"ISPs focus on measuring their own backbones and devise a collection of tools that help them engineer and manage their cloud," says Farnam Jahanian, a professor in the department of electrical engineering and computer science at the University of Michigan in Ann Arbor and program director of the IPMA project. "We need metrics and tools that cross ISP boundaries."

The IPMA intends to measure baseline Internet performance metrics such as packet loss, latency and routing efficiency. To accomplish the task, Merit engineers will deploy a mesh of data collection probes to cooperating sites on the Internet — including ISP nets, metropolitan-area exchanges, network access points and corporate user locations. Jahanian hopes to complete the probe architecture deployment by midyear.

The collected data will worm its way back to Merit's data analysis engines, where network engineers and researchers can access it through a series of visualization tools.



CLAY MEYER

The IPMA isn't interested in becoming a data reporting agency, says Craig Labovitz, a principal investigator for the IPMA project and developer of NetNow, a data visualization tool. "We're interested in working with folks who run the networks, and that means we have to be sensitive to some of the information that may arise," he says.

Labovitz says some ISPs that agree to house a data probe in their network may not agree to release metrics data for public consumption, but instead leave it up to the ISP to dole out data it wishes.

In parallel with the IPMA effort, the San Diego-based Cooperative Association for Internet Data Analysis (CAIDA) is developing tools that measure Internet traffic flow and working to give ISPs a way to share performance metrics data.

CAIDA engineers also are working to help foster the development of Border Gateway Protocol routing instability diagnosis, Web caching, bandwidth reservation, multicast and next-generation protocols such as IP Version 6.

### IETF gears up

As groups like Merit and CAIDA work to spit out performance metrics tools, the IETF is gearing up to establish standards for key Internet performance measurements.

The IP Performance Measurement working group is finalizing four basic metrics that it intends to present to the full IETF for standards approval in March, according to Vern Paxson, co-chairman of the IPPM working group and an engineer at Lawrence Berkeley Labs, in Berkeley, Calif. The metrics will gauge connectivity, packet loss, packet delay and bulk transfer capacity.

The connectivity metric is a simple test that checks to see if you can send a packet and receive a reply.

But the metric for bulk transfer capacity is trickier to develop, Paxson says. If you transfer data from Point A to Point B, how fast will it flow? This metric must account for congestion control, which likely will vary among ISPs.

While IPPM is devising only standards-based metrics, Paxson hopes to see the day the performance metrics standards are used to hold ISPs accountable. "It would be a nice outcome if people start writing contracts saying they'll use the IPPM metrics and specify amounts of money at stake and the penalties for not meeting metrics goals," Paxson says.

AT&T WorldNet supports the idea of such initiatives, says John Friedmann, division manager of Internet performance and data mining at AT&T WorldNet, in Bridgewater, N.J.

"Customers are beginning to demand [service-level agreements] and performance measurements," Friedmann says. ISPs are offering early versions of SLAs. "I expect those to improve and evolve as our measurement capabilities improve," he says.

Although PSINet, Inc. hasn't yet committed to a specific Internet performance metric initiative, the corporate ISP also perceives them as valuable tools, according to a company spokesman.

Separate from the IPPM initiative, some researchers already are using the IPPM standards to begin devising analysis tools. Paxson has received funding from the National Science Foundation and the U.S. Department of Energy to develop the National Internet Measurement Infrastructure (NIMI).

NIMI's goal is to create a number of measurement end points in the Internet to measure packet loss, delay and connectivity.

"We hope the utility of NIMI will become clear and it will grow on its own accord," Paxson says. One outcome might be that users demand this type of performance measurement from their ISPs.

**MEASURING UP WITH INTERNET PERFORMANCE METRIC TOOLS**

| Developer | Tool | Description |
|---|---|---|
| CAIDA | Coral | A suite of high-performance network statistics collection tools focused on OC-3 and OC-12 links, with FDDI, raw SONET and possibly T-3 tools to come |
| CAIDA | MapNet | A tool for simultaneously visualizing the infrastructure of multiple backbone providers and for updating and correcting invalid information |
| Merit Networks | NetNow | Measures packet loss/latency between network access points (NAP) |
| Merit Networks | ASExplorer | Provides a map of NAP route instabilities |
| Guy Almes/Internet 2 | Surveyor | Internet 2 measurement infrastructure |
| National Laboratory of Applied Network Research | fishes | Plots latency variance on routes to various hosts |
| Vern Paxson | Network Probe Daemon | Predicts route behavior by analyzing trace-route data from some end hosts |

Source: CAIDA

While initiatives at the IETF and research institutions such as Merit and CAIDA are moving slowly to spawn Internet performance measurement tools, the ANX effort is charging ahead.

Bellcore kicked off the ANX Release 1 pilot in December with the participation of about 30 trading partners and four service providers. Bellcore is working out the kinks and expects to launch the program in May to the organizations that qualify to provide IP service to the auto giants and their partners.

Bellcore will certify only those providers that meet the ANX performance objectives. Once an ISP or carrier is certified, it must meet "a lifelong obligation of maintaining the certification criteria or risk being put on probation or even worse, being barred from offering service to the lucrative automotive trading partners," Whittle says.

If a carrier falls below performance thresholds, ANX will open a 30-day trouble ticket, giving the carrier a month to correct the problem. If that period lapses without improvement, ANX places the carrier on 60-day probation, notifies all trading partners and forbids the carrier from signing new ANX clients until the problem is fixed. In a worst case, ANX can revoke a carrier's certification and ban it from providing service indefinitely.

At present, the process does not specify that carriers must pay financial penalties for substandard service, but that doesn't preclude individual ANX partners from specifying such provisions in their carrier contracts, Whittle says.

The ANX program defines eight service categories that carriers must address in order to provide consistent and reliable service. Carriers must comply with metrics for service reliability, performance, interoperability, business continuity, security, customer care, trouble handling and network service. Trouble handling refers to the carriers' ability to work with competitors to fix problems, while network service means the carrier must offer customers monthly link utilization reports.

After the first year of the ANX Release 1 program, carriers will have to undergo recertification. ANX will make performance metrics more stringent and require support for new applications such as collaborative CAD, videoconferencing or real-time voice, Whittle says.

"We need more industry focus on reliability and availability of services," he says. "We've brought in a set of reliability criteria far beyond what you'd see in the typical ISP agreement today. But business customers need this type of high reliability, and we're going to give it to them."

**Get more online:**

- **CAIDA hosts a definitive site on Internet performance measurement, including a comprehensive list of available tools**
- **IPMA project details, tools and discussion group**
- **Merit Networks' Route Arbiter site reports on the performance of ISP interconnection points**
- **Links to commercial Internet performance measurement services**

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*When he wrote this story, Bruno was enterprise editor for* Network World. *He is now managing editor of Publishing Products at The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at cbruno@tolly.com.*

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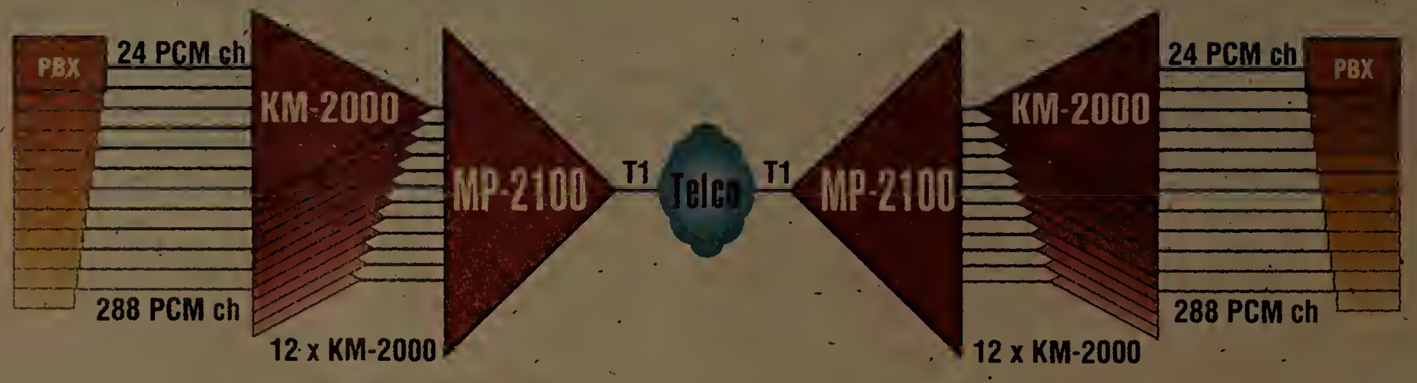

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## REVIEW

FOR HEAVILY LOADED NETWORKS, SWITCHED 10M BIT/SEC ETHERNET BEATS ITS BIG BROTHER, SHARED 100M BIT/SEC.

# Slower can be better

By Robert Currier

*Users are up in arms about bad response time, and you know they're right. Your old 10M bit/sec Ethernet workgroup hubs are straining under ever-increasing loads. It's time for an upgrade.*

You figure shared 100M bit/sec Ethernet hubs should do the trick. After all, they'll give you 10 times more bandwidth than the existing hubs.

Whoa. Slow down, literally. When we set up a workgroup configuration where 11 clients and one server heavily loaded the network with a steady stream of bidirectional 100K byte files, we found that switched 10M bit/sec Ethernet to every desktop gave us better performance.

The reason is quite simple. With shared 100M bit/sec technology, you'll get inordinately high collision rates when the network is heavily loaded, resulting in more bandwidth being consumed for retransmissions. Switched 10M bit/sec Ethernet distributes traffic more evenly, nearly eliminating collisions and ultimately delivering more data in the same amount of time. In fact, we found switched 10M bit/sec Ethernet managed to squeeze roughly 9% more bytes through the network than shared 100M bit/sec.

When we had clients sending less bandwidth-consuming traffic, shared 100M bit/sec Ethernet outperformed switched 10M bit/sec by nearly two to one. However, when you factor in the cost of equipment, switched 10M bit/sec Ethernet still comes out better because the price you'll pay for 100M bit/sec equipment outweighs what you will gain in performance.

In fact, you can get a 10M bit/sec Ethernet switch with 24 full-duplex client ports, a 100M bit/sec full-duplex server port, support for four Remote Monitoring (RMON) groups, an 8K media access control table, front panel LEDs for management and an open slot for a management module for $1,299. A less-functional 24-port shared 100M bit/sec hub with front-panel LEDs for management and support for SNMP without RMON costs $1,379.

This is what we learned from the testing of two configurations supporting our 11 clients and a single server. The first used a 100M bit/sec shared Ethernet repeating hub where each client and the server shared access to 100M bit/sec of bandwidth. The other employed a 10M bit/sec Ethernet switch where each client had a dedicated 10M bit/sec to the switch and the switch aggregated traffic from all clients on a dedicated 100M bit/sec link to the server.

**AVERAGE PERFORMANCE FOR FILE TRANSFER TRAFFIC**

| | Switched 10M bit/sec full-duplex mode | Shared 100M bit/sec | Switched 10M bit/sec half-duplex mode |
|---|---|---|---|
| **Bytes transferred** | 651.7M bytes | 597.6M | 526.6M |
| **Throughput average (server)** | 87.47M bit/sec | 80.35M bit/sec | 70.61M bit/sec |
| **Throughput range (clients)** | 5.68M to 8.87M bit/sec | 0.93M to 17.56M bit/sec | 4.59M to 6.77M bit/sec |
| **Response time average** | 0.10 second | 0.20 second | 0.13 second |
| **Response time range** | 0.09 to 0.14 second | 0.04 to 0.86 second | 0.11 to 0.17 second |

We measured throughput and response time for two different traffic mixes in each environment. In our first test, we fully loaded the network with the bidirectional 100K-byte file transfers. Next, we had some clients transferring files while others performed SNMP operations, established telnet sessions, checked for mail using Post Office Protocol 3, downloaded Web pages using HTTP or received PointCast network broadcasts. Using mixed protocol traffic lightened the overall load because some of the protocols are bursty in nature and required less bandwidth than the more steady bandwidth-consuming file transfer.

### Switched 10 handles heavy burden

The 10M bit/sec Ethernet switch got the edge in our file transfer test, thanks to its even bandwidth allocation to clients and near collision-free full-duplex server connection. In testing, each client turned in nearly identical throughput of 8.5M bit/sec and response times of between .09 and .14 seconds.

Our weakest performing clients, averaging less than 6M bit/sec each, were an OS/2-based machine with a 233-MHz Pentium processor and 32M bytes of RAM, and a Dell Computer Corp. Dimension XPS with a 100-MHz Pentium and 16M bytes of RAM. The OS/2 machine had an IP stack that performed poorly. The Dell's performance lagged primarily because it was underpowered compared with our other Dell clients, which had processors ranging from a 166-MHz Pentium to a 233-MHz Pentium II and 64M bytes of RAM.

The server sustained a blistering 87.5M bit/sec transfer rate to the switch's 100M bit/sec port. It successfully pushed 652M bytes of data through the pipe at the end of our one-minute test run, leaving just 12.5% of capacity unused. These numbers demonstrate the advantage offered by a full-duplex 100M bit/sec server port. The lack of collisions on that port allowed the server to handle each workstation's datastream without dropping any frames. Furthermore, the server left it up to the switch to redistribute data to the appropriate clients as fast as that data came in.

Changing the network interface card (NIC) in our server to operate in 100M bit/sec half-duplex mode reduced throughput by 20%, from 87.5M bit/sec to 70M bit/sec. The switch also passed 527M bytes of data to the clients in half-duplex mode, 125M bytes less than it did in full duplex.

On the client side, the average transfer rate slipped from 8.5M to 6.5M bit/sec in half-duplex mode. The 2M bit/sec drop occurred primarily because we were getting fewer bytes through the half-duplex server port and the switch throttled back clients appropriately.

There's a moral to this story: Don't run your server in half-duplex mode, especially on heavily loaded networks. The majority of NICs sold today provide both full- and half-duplex modes. As long as your switch provides a full-duplex server port, there's no excuse not to take advan-

**AVERAGE PERFORMANCE WITH MIXED PROTOCOL TRAFFIC**

| | Shared 100M bit/sec | Switched 10M bit/sec half-duplex mode | Switched 10M bit/sec full-duplex mode |
|---|---|---|---|
| **Bytes transferred** | 347.6M | 172.8M | 171.1M |
| **Throughput average (server)** | 72.87M bit/sec | 51.97M bit/sec | 51.8M bit/sec |
| **Throughput range (clients)** | 0.006M to 17.74M bit/sec | 0.011M to 8.54M bit/sec | 0.012M to 8.59M bit/sec |
| **Response time average** | 0.06 second | 0.074 second | 0.074 second |
| **Response time range** | 0.002 to 0.21 second | 0.001 to 0.20 second | 0.001 to 0.20 second |

tage of the increase in performance you're bound to get.

When we turned our attention to the shared 100M bit/sec hub, we quickly found that throughput was all over the place. Prior to the test, we performed loop-back testing in which each client sent data to itself. This loop-back gave us an indication of how fast clients would be able to submit traffic to the network if they were not constrained by the physical limitations of the topology.

When attached to the 100M bit/sec hub, workstations capable of putting 45M bit/sec of traffic on the network were reduced to just under 1M bit/sec, while those we clocked at 99M bit/sec were only grabbing 18M bit/sec.

Looking at the front panel of the 100M bit/sec Ethernet hub provided the answer to this bandwidth quandary. Collisions were putting a cap on performance. While we weren't able to capture any collision statistics because of the lack of management software on our hub, the solid-red collision LED light gave us a pretty clear indication of what was happening.

Because it was constrained by collisions, the 100M bit/sec hub successfully pushed only 598M bytes to clients during the test run, while the server averaged 80M bit/sec of throughput across the hub's shared backplane.

You'd think that the hub with the higher bandwidth would have beaten the pants off the switch. However, with all the clients sending as much data as they could to the hub, there was a lot of contention for that bandwidth. As a result, little of that data was successfully getting through.

Because the switch gave each client 10M bit/sec of dedicated bandwidth, it did not have to deal with collisions and thus was able to successfully deliver nearly every bit of data it received from clients. The 100M bit/sec dedicated server port helped in this regard by aggregating traffic from clients on a high-speed link with few, if any, collisions.

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The performance table turned in 100M bit/sec Ethernet's favor in our test of mixed protocol traffic. In fact, the shared 100M hub transferred twice the bytes and averaged roughly 40% greater throughput than the 10M bit/sec switch.

The hub successfully got 348M bytes of data to clients in the allotted test time, while the switch delivered 171M bytes in full-duplex mode and 173M in half-duplex. We didn't see any performance improvement in full-duplex mode in this test because the network was not as heavily loaded as it was in the file transfer test.

The server throughput on the hub was 73M bit/sec compared with 52M bit/sec on the switch in full- or half-duplex mode.

The primary reason for the turnaround is that mixing high bit stream file transfer with bursty traffic acted as an artificial bandwidth allocation mechanism. For instance, the clients configured to send file transfers were able to grab as much of the 100M bit/sec of bandwidth as they could get. The fact that the other clients were sending bursty traffic kept the number of collisions down, enabling those file transfer clients to successfully get more data

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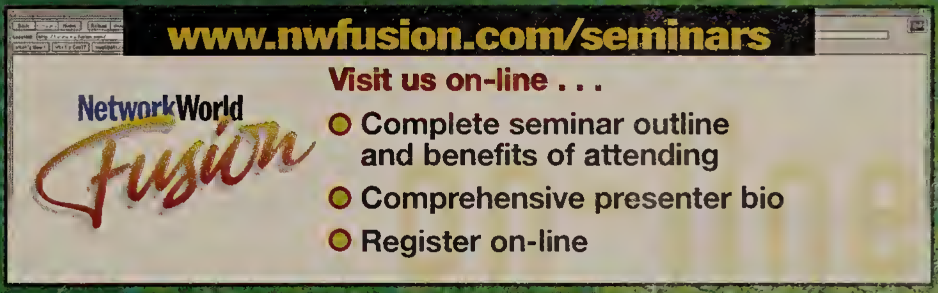

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through the network.

We verified this by watching the front panel LEDs on the hub. In the file transfer test, all clients were dumping as much data as they could on the network and keeping the hub's coilision light brightly lit. However, with the lighter traffic generated by the mixed protocols, we observed only a flickering collision light, indicating that the hub was successfully delivering more data as opposed to dealing with continual retransmissions.

But the switch throttled back the file transfer clients because of its inherent speed limitation of 10M bit/sec. Those clients were capable of sending data at 70M to 80M bit/sec, but the switch only gave them 10M bit/sec of useable bandwidth. At the same time, the switch handled the bursty traffic as it was being sent.

In short, the hub performed better under the lighter load because it enabled the couple of bandwidth hogs to grab as much capacity as they could, while the switch had to throttle them back.

As noted, there wasn't much difference in the performance of the switch as we went from full- to half-duplex mode. The load on the network was light enough that the advantages provided by full-duplex didn't make any difference.

Still, with the low price per port of today's 10M bit/sec switches and the solid numbers we observed in the file transfer test, switched 10M bit/sec can give you better price performance on heavily loaded networks and acceptable performance for less money on lightly loaded nets. Unless 100M bit/sec hub pricing takes a big drop, the advantages offered by switching give it the edge.

*Currier is the director of data communications at Duke University in Durham, N.C. He is the recipient of* Network World's *1997 User Excellence Award and an Honorable Mention in the 1997 Excellence in Campus Networking competition sponsored by CAUSE, a users group for computer professionals in higher education. Currier can be reached at (919) 660-6995 or rdc@duke.edu.*

## *How We Did It*

We used a Cisco Systems, Inc. Catalyst 1900 10M bit/sec Ethernet switch and a Cisco FastHub 100 shared 100M bit/sec hub to connect 11 Dell Computer Corp. clients with a Pentium or Pentium II processor and Windows NT 4.0, Windows 95, OS/2 or NetWare 4.0 to an Intel SMP-4 with four 200-MHz Pentium Pro processors, 128M bytes of RAM and a Windows NT 5.0 beta.

Clients were connected to a dedicated 10M bit/sec port on the switch, while the server was connected to a dedicated 100M bit/sec uplink port operating in half- and full-duplex modes. Clients and the server were connected to 100M bit/sec ports on the hub and communicated with each other across the shared backplane.

Before testing, we established a baseline for each of the clients and the server by running a loop-back test using Ganymede Software Inc.'s Chariot testing software. The loop-back test measured how quickly a given client would be able to get data to and from the network if it were not constrained by the physical limitations of the topology. The baseline gave us a good idea of how a given machine would perform under normal conditions.

Once we established a baseline we used two of Chariot's test scripts. The first emulated a large file transfer across the network, and the other used a mix of traffic in an attempt to duplicate a typical production network.

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By Amy Schurr

In February of last year, John Scoggin got the assignment of a lifetime — the chance to help build a telephone company from the ground up.

Delmarva Power & Light Co., looking to take advantage of new opportunities created by the Telecommunications Act of 1996, was launching Conectiv Communications, Inc., a competitive local exchange carrier that would take on incumbent LEC Bell Atlantic. As chief technical advisor for the gas and electric utility's special services unit, Scoggin had just 10 months to renovate a building in Newark, Del., and turn it into a functional central office (CO) and network operations center.

In November 1997, right on schedule, Conectiv rolled out local and long-distance service to business and residential customers in Delaware and southeastern Pennsylvania. The carrier plans to expand service to Maryland next month and to southern New Jersey in May.

How did Conectiv pull it off? The key was basic teamwork and a willingness to get things done, Scoggin says. "Everyone was very excited to be part of a start-up and pitched in to get things done, whether it was trying to turn up a SONET ring or helping me unload our trucks," he says.

### Breaking into the business

Looking to diversify, the utility decided to enter the local telephone market when the telecom act lowered the barriers to competition. The new enterprise was a good fit because the company already had a 500-mile fiber network that spanned much of the Delmarva Peninsula, a tristate peninsula that juts into the Chesapeake Bay.

The initiative also was part of a larger plan for Delmarva to merge with Egg Harbor Township, N.J.-based Atlantic Energy, Inc., forming the holding company Conectiv. The Securities and Exchange Commission approved the merger late last month, and it closed last week.

After developing a business plan for switched services and beefing up its engineering department, Delmarva Power & Light spun off Conectiv Communications as a subsidiary in late 1996. Once Conectiv won regulatory approval to enter the local phone market in February 1997, its staff worked at warp speed to be ready to open for business in November.

The new carrier brought the network operations workers over from the core business, along with most of the telecom engineering staff. But the company still needed more technical workers and quickly.

Not surprisingly, recruitment was somewhat difficult. "I would have pressed harder on hiring earlier had I known we were going into the switched services business," Scoggin says.

Most of the new hires came from the West Coast and worked with other telecom companies, which helped close some of the skills gaps. Fortunately, some of Conectiv's management recruits brought a few of their former colleagues with them.

Perhaps most important, everyone on staff had a clear vision and understanding of what needed to be accomplished and when, says Jeffrey Allen, executive vice president at Conectiv. "We gave people an awful lot of authority to get the job done. If you bring in the right people, you're better off getting out of the way."

**John Scoggin's** *team at Conectiv Communications pitched in to unload trucks full of the new phone carrier's equipment.*

JOHN PERLMUTTER

### A big display of energy

With its staff falling into place, Conectiv turned to constructing the CO and network operations center. The company relocated several departments and gutted the entire first floor of their building to make room for the new facilities.

"Every nut, bolt and screw was new," Scoggin says. "We didn't do a lot of product evaluation. I knew what I wanted, and we have all been around the block," Scoggin says. Besides, the team didn't have time to waste. "One of the biggest challenges was physically getting the material here in such a short time," he says.

Conectiv's purchasing department helped streamline the chore of ordering millions of dollars worth of equipment by authorizing orders and otherwise giving network operations essentially free rein to act as its own purchasing department.

The biggest purchase by far was Nortel's DMS 500 Local and Long Distance Switch, which is the heart of the CO. The 30,000-line box cost roughly $2.8 million, Scoggin says.

He was impressed with Nortel's speedy delivery. Conectiv ordered the DMS 500 in April and received the hulking switch by June. Vendors usually need four to six months to deliver telco switches because of the enormous amount of engineering involved. Conectiv's internal engineering team and Nortel consultants installed the switch in 7 1/2 weeks, finishing three days before the Aug. 1 deadline.

Conectiv staff performed the laborious task of tying the outside fiber-optic cable into the switch. The job entailed a massive amount of wire wrap connections, fiber connections and physical labor, says Scoggin, who served as engineer for the switch installation.

To meet the deadline, the group put in 16-hour days and used two shifts of technicians. Because there were so few network operations staffers in the initial stages of the project, getting the job done often meant pitching in to unload equipment from delivery trucks, even if you were the vice president.

"We had people who were supposed to be doing clerical work performing wire wrapping after a short training class and management-level people unloading the trucks. Whoever was handy at the time when something needed to be done, did it," Scoggin says.

It was easy to motivate employees to work long hours and do things that weren't part of their jobs because workers were excited to be involved in a start-up, he says. "They knew it was a once-in-a-lifetime opportunity to bring something up from nothing," Scoggin says.

The chance to master new skills also made the project attractive, particularly for several younger employees and recruits who came from the telecom business. Some workers had a very narrow range of specialized skills, but the shortage of staff at Conectiv gave them an opportunity to learn a little about a lot of different things.

Nortel's quality assurance inspectors were impressed when they checked out Conectiv's installation work.

"Our group made 12,000 wire connections to link the switch to the fiber-optic network. We tested and only found two mistakes, which were corrected in less than five minutes," Scoggin says. That's not to say the group didn't encounter some glitches. For example, Scoggin chose to use Lucent

Technologies, Inc.'s GPS 4848, a beta DC power system, because the model was energy efficient, scalable and easily maintained.

"I found a failure mode where I could vaporize a portion of the rectifier at will," Scoggin says, referring to a device that converts AC power into DC power. "I blew up four 200-amp rectifiers in five minutes. It sounded like a shotgun shell discharging."

The same afternoon, Bell Labs engineers arrived in Newark to diagnose the problem. "That was a lot of fun watching the looks on their faces when I blew things up," he says.

The engineers redesigned the rectifier, field-modified the remaining power systems and flew out the next day.

### CONECTIV FACTS AND FIGURES

- The carrier invested about $50 million in its network in 1997. More than half of that amount went toward fiber-optic lines and a Nortel DMS 500 switch.
- Conectiv Communications will make about $50 million in infrastructure investments in 1998. Future investments of $30 million to $40 million per year will be used to fill and build its network.
- Corporate executives expect the company to turn a profit in the year 2000.
- Customers save 10% to 20% off Bell Atlantic's rates.
- The company is currently readying ATM, frame relay and IDSL services for full-scale rollout.

**Persevering through problems**

People and political issues also posed obstacles, said Conectiv managers.

The network operations construction required a lot of companywide coordination because workers needed to relocate the electric group's network operations without causing a power outage.

Scoggin had trouble interacting with the electric utility side of the company. Some departments didn't share his sense of urgency and weren't as responsive as he would have liked. But he persevered. "They realized I wasn't going to go away. I'm kind of like the grain of sand in the clam," he says.

Working with Bell Atlantic was no picnic, either. Negotiating interconnect agreements with the carrier was a chore, particularly because Conectiv has a regional focus and each state has specific filing requirements, says Laird Levison, Conectiv's vice president and chief operating officer at the time.

"One obstacle is when your major supplier is also your major competitor," Allen says. "That's a huge challenge, and we spend lots of time on issues and problems that should be transparent to the customer." For instance, Bell Atlantic's legacy phone order processing system was paper driven until recently, which was time-consuming and labor-intensive for Conectiv customer representatives.

Despite these challenges and the intense workload, most of Conectiv's staff would volunteer for a similar project again.

"It's a lot of fun to change from a cost center to profit center. It changes your outlook on how you provide the service when you support external customers," Scoggin says. There's quite a difference in the company's former internal goal of 99.5% uptime and the current minimum of 99.999% uptime, he points out.

Fortunately, Conectiv has enjoyed 100% uptime to date. "We had fiber cuts, but SONET's self-healing rings saved us," he says. ■

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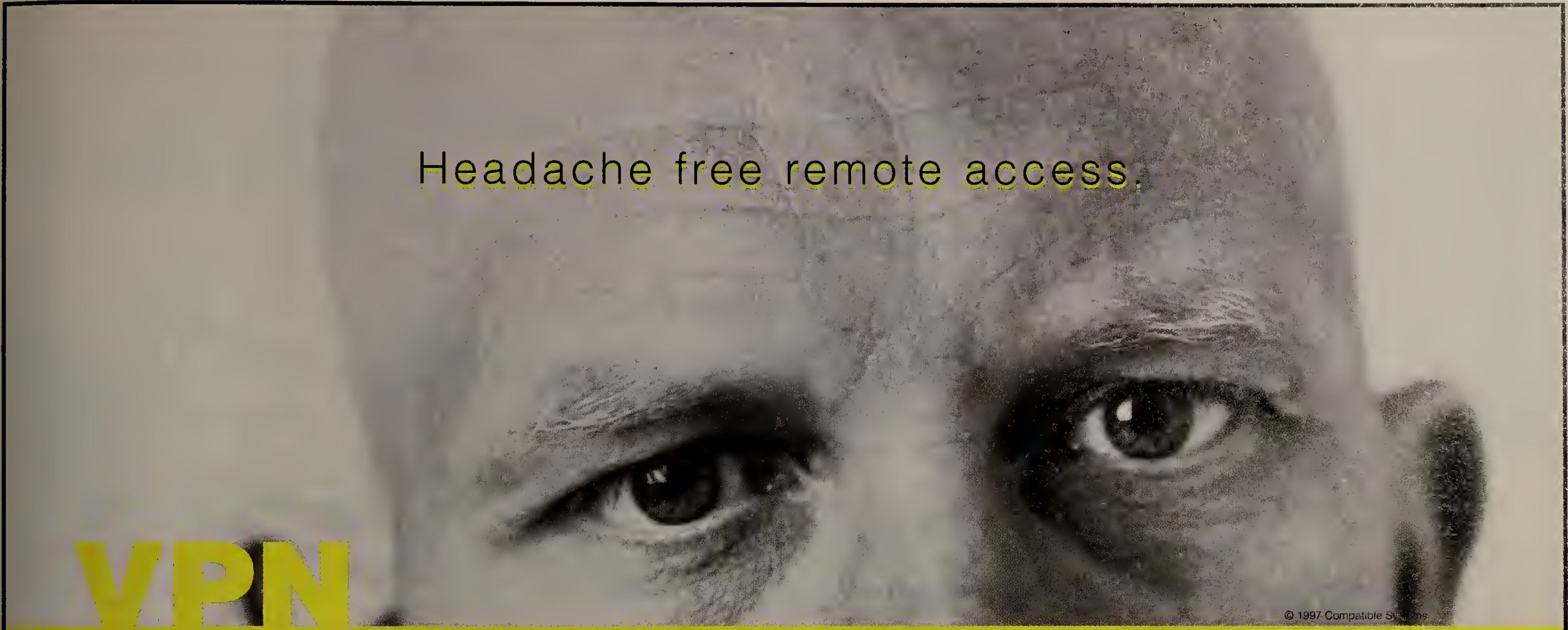

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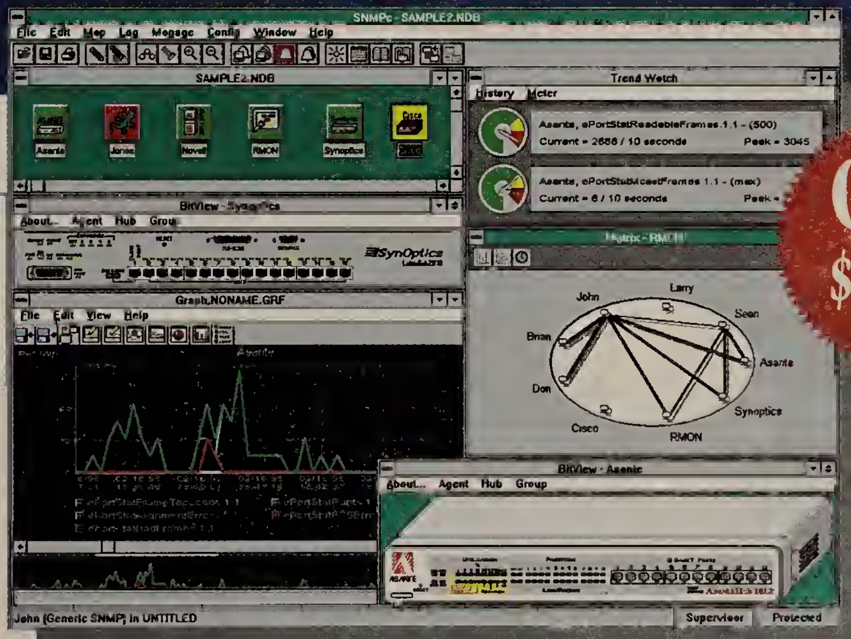

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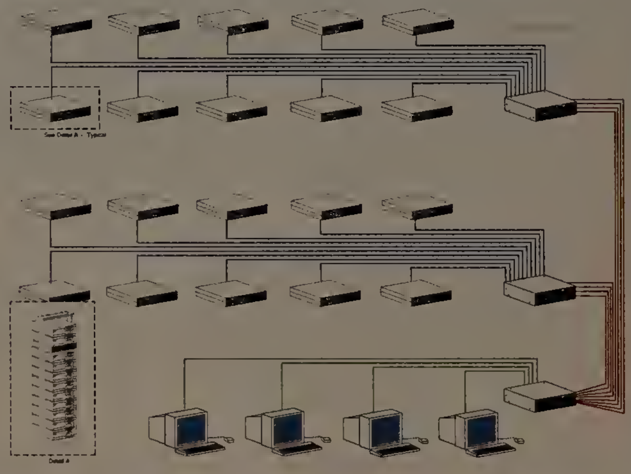

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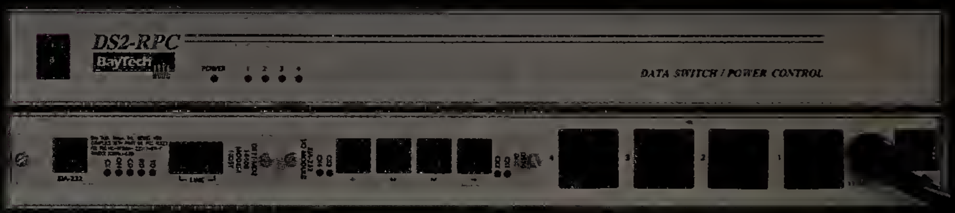

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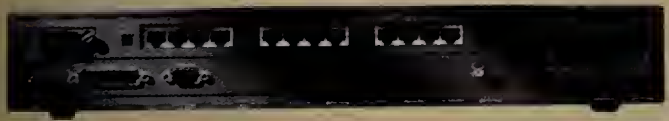

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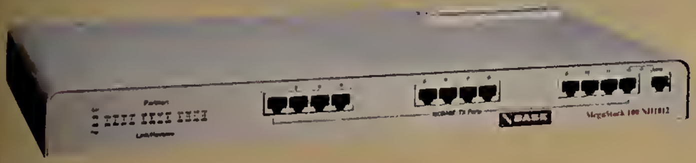

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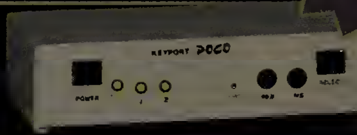

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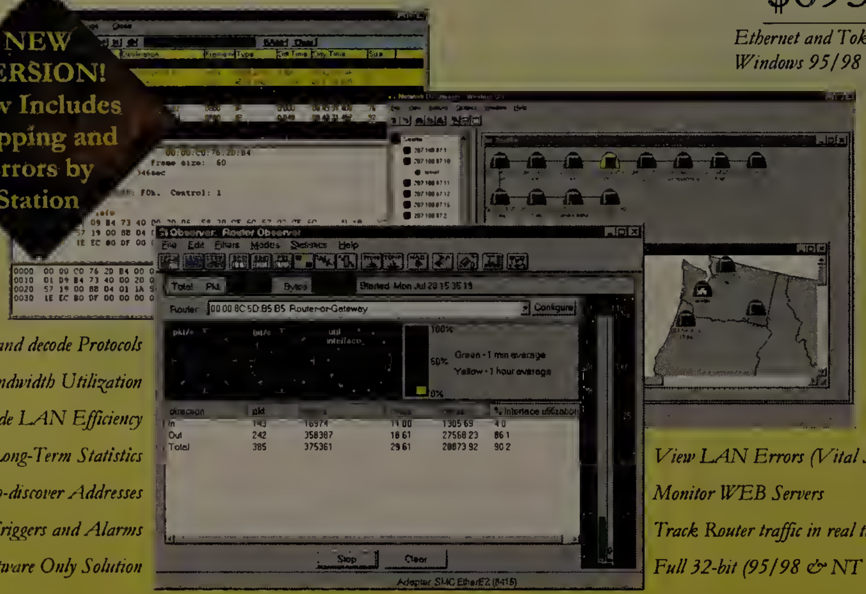

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# E-mail

*Continued from page 1*

annointed by experts as one of the two best products in this emerging field. The other is NaturallySpeaking from Dragon Systems, Inc., which, for $169, allows users to dictate e-mail into their Lotus Notes and Microsoft Exchange outboxes.

Whereas earlier versions required speakers to pause between words, NaturallySpeaking and ViaVoice allow for continuous dictation, albeit after several hours of training for the user.

Improvements have made speech-to-text a natural fit for messaging, according to Michael Osterman, director of market research at Creative Networks, Inc., a consultancy in Palo Alto, Calif.

"With e-mail, there is usually not a lot of emphasis on grammar, spelling, capitalization and so forth," Osterman said. "It just strikes me that [speech recognition and e-mail] have to come together."

Messaging vendors appear to agree. Microsoft last fall invested $45 million in Belgium-based Lernout & Hauspie, whose dictation offering, called Voice Xpress, is expected to ship this spring. Microsoft has talked about sprinkling the technology throughout its product lines.

## Pros and cons of spoken e-mail

**Whether you need the capability or not, speech-to-text is coming to an e-mail client near you.**

**Pros**

- Relief for those who cannot type
- Saves time — most people speak twice as fast as they type
- E-mail etiquette allows for informal syntax and grammar

**Cons**

- Jargon, nuances and voice inflections are difficult to translate
- Microphones still need improvement

Speech-to-text products are seeing success not only with users physically unable to type, but also among keyboard-shy executives and in markets such as the medical and legal professions. However, a random sampling of corporate IT managers last week prompted mostly skeptical comments.

"I don't see any near-term application of this in general business," said Tom Connors, a senior member of the technical staff at Texas Instruments, Inc., in Attleboro, Mass. "In general, the value is not there for the mass market."

Another network manager buttressed Connors' point.

"I've heard that the voice-recognition technology is improving, but I feel this product is only useful for people with some type of handicap," said Brian Holle, e-mail administrator at Roche Bioscience, in Palo Alto, Calif. "I have not heard of any plans to look at it for our company."

Which isn't to say that no network managers are interested.

"I can actually see a niche for this," said Travis Berkley, supervisor of LAN support services at the University of Kansas. "If it's got some nice tight integration [into e-mail] . . . I think it might fly. Speakerphones found their place, right?"

According to Roger Matus, vice president of marketing at Dragon Systems, users' need for speed will eventually convert even skeptical e-mail typists into e-mail speakers. A good typist bangs out 60 words per minute, he said, while people typically talk at a pace of 130 or 140 words per minute.

"Which means you could create an e-mail in half the time because you talk twice as fast," he said.

Perhaps, but not even the most bullish vendors are predicting that users will be ditching their keyboards en masse. ■

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7. Review service offerings that are available today and learn how network managers are using xDSL to meet their company needs.
8. Understand how DSL affects the Customer Premises — what are special wiring requirements, CPE functionality end form factors.
9. Learn the steps for deployment, how to contact a service provider(s), negotiate service contracts and if service level agreements are available.
10. Review the top 10 questions to ask a service provider about xDSL services.
11. Explore what new and future product enhancements will further the case for DSL.
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## DSL

*Continued from page 1*

results with *Network World* and this week will reveal the results publicly at the DSLcon '98 conference here. Full results will be posted at dsl.avalon.net later this week.

This is the first time a service provider has revealed details of its technology trials, though many of DSL's problems have been acknowledged in the past by modem makers and other service providers that have run tests.

### HOW FAR CAN THEY GO?

**Tests by Iowa Internet service provider Avalon Networks found that DSL modems work over limited distances between customers and carrier switching offices:**

| Modem | Maximum line length (in feet) |
|---|---|
| Amati Overture 810 | 15,000 |
| Aware X200 | 21,000 |
| NetSpeed SpeedRunner | 10,000 |
| Pairgain 768 | 10,000 |
| Pairgain CRA | 15,000 |
| Pairgain (Falcon prototype) | 21,000 |
| Paradyne Hotwire | 15,000 |
| 3Com/U.S. Robotics Viper | 10,000 |
| Westell FlexCap2 | 15,000 |

"The [regional Bell operating companies] have this information, they just aren't releasing it," said Randy Carlson, an analyst with The Yankee Group, in Boston.

Avalon last November began testing modems from seven vendors on 17 regular copper phone lines leased from US WEST, Inc. The goal was to find out whether modems at either end of the lines could connect, and if so, at what speeds. Avalon found that speeds declined as line length increased and eventually the modems couldn't connect at all (see chart).

"We haven't hit nirvana on modems yet," said David Lacey, Avalon's president.

In general, Avalon found that products based on the standard-based DSL technology, known as discrete multitone (DMT), were more susceptible to speed drops due to low-quality circuits and long lines than were devices using the alternative, carrierless amplitude modulation (CAP) technology.

But DMT seems to be maturing rapidly. Lacey said a prototype DMT-based modem from Pairgain Technologies, Inc. worked as well as the best performing CAP modem, Westell Technologies, Inc.'s FlexCap2.

Avalon also wanted to know whether modems would drop connections over periods ranging from 24 to 72 hours, so the company measured how long it took to re-establish dropped connections. That period ranged from 12 seconds for Pairgain modems to 35 seconds for modems from Amati Communications Corp., now part of Texas Instruments, Inc.

"All these vendors are claiming they have the best product. Well, a lot of them have some problems yet," Lacey said.

For example, in Avalon's tests, Amati modems failed to establish connections on lines that posed no problem for other vendors' modems. Also, Aware, Inc.'s X200 modem frequently negotiated connection speeds that were too high to maintain, and as a result the connections frequently dropped, Lacey said.

With many DMT devices, the amount of traffic flowing toward the customer modem can affect the maximum speed of traffic flowing away, Avalon found. When the upload stream is pushed to its limits, the downstream bandwidth plummets, Lacey said.

That could affect TCP sessions, which require a back channel bandwidth 10% the size of the forward channel bandwidth to keep the session alive. The problem did not appear with CAP modems, Lacey said.

Other factors can hurt modem performance, too. A T-1 line inside the same network cable as a DSL line can cause crosstalk that reduces the maximum bandwidth the DSL line can carry. However, Avalon tests found negligible interference from ISDN lines and from other DSL lines.

But the company did find that a Sioux City, Iowa AM radio station interfered with DSL lines. The station's radio signal invaded frequencies in the wire that would otherwise have been used by the DSL modems. This interference reduced the speed at which the DSL modems could connect, but not critically, Lacey said.

Customers might think speed is everything, but Avalon did not look at it that way. Web browsers cannot handle more than about 1.5M bit/sec worth of data anyway, so giving customers more bandwidth on the access link would not improve performance, Lacey said.

Avalon was more interested in modems being able to establish connections over 10,000-foot lines and being able to maintain those connections without a technician's tinkering, he said. ■

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## Win98

*Continued from page 1*

It should be easier for Microsoft to pull out the browser, but even this is not clear. For instance, if Microsoft, or users, remove the IE dynamic link libraries (DLL) that are now found in Win98, "you are starting to get into the bowels of the operating system," said an independent computer consultant in central California.

Microsoft officials said Win98 is nearly finished, but they refused to comment on how DLLs are configured in the product. Product managers also declined to say what portions of the code relate solely to Internet functionality

"It gets very gray," explained Stacey Breyfogle, a Win98 product manager. "Is the HTML rendering engine considered Internet functionality, since it is used for so many things that have nothing to do with the Internet [such as the help system]?" Breyfogle asked.

### Application hooks

While Microsoft could conceivably pull out the browser, the company may also succeed in disabling a whole new class of applications.

"Every single pixel you see on the screen when you use the Internet Explorer browsing window was put there by operating system services that any vendor creating Windows-based applications can use," wrote Joe Belfiore, group product manager of the Windows User Interface Group, in a document posted on a Microsoft Web site.

Indeed, many developers are being prompted by Microsoft to exploit IE in new applications and upgraded programs, making the "dis-integration" of the browser from the operating system difficult for developers to handle. "I think it'd be a problem to pull out the browser, because Microsoft has told developers to write to the browser," said Bob Brodie, product marketing manager at Fujitsu Software Corp., in San Jose, Calif.

If the government presses for the browser's removal, Microsoft could reach a compromise as it did with Win95. "The compromise would leave the code in there, but prevent a [browser] icon from being displayed," said Mike Sax, president of Sax Software, Inc., a developer of Windows components in Eugene, Ore. That way, applications would still be able to take advantage of the Web browsing capabilities.

If they have to extract the code altogether, then "it would be a disaster," Sax said. Applications developed with the browser in mind would be harmed because "there would not be a single set of Internet access capabilities they could rely on," Sax concluded.

### Putting it back together

Of course, as with today's Win95/Internet Explorer 4.0 combination, an Internet Explorer-less Win98 also would have to provide some way to reinstall the browser — either by an OEM or end user. "My best guess is if Microsoft isn't required to remove all of the browser's files, there would be a small program that would re-enable the browser. It'll put the hooks back into the files and DLLs, and the browser would be functional again," said Mark Pace, vice president of technology at Action Systems, Inc., of Belmont, Calif.

Just the same, the majority of those contacted for this article believed that Microsoft has made it difficult, if not impossible, to separate the two products. Scott Adams, a senior software engineer for Avista, Inc., a software-development company in Platteville, Wis., said Internet Explorer and Windows 98 are very much intertwined.

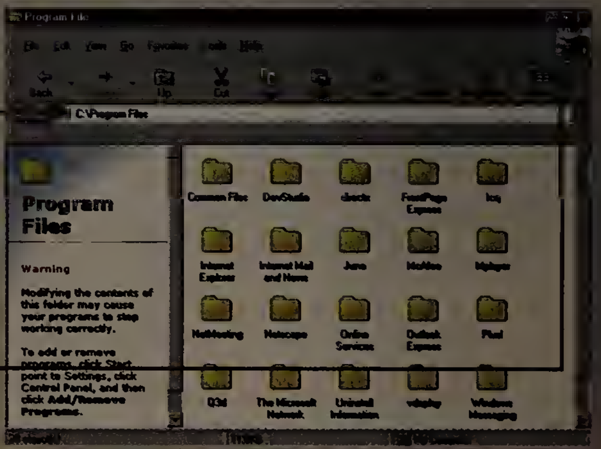
"Your desktop is looking at the Web. IE used to be an add-on to the operating system, but Microsoft has done its darndest to weave it into the system," Adams said. ■

### A Window with two purposes

**Windows 98 will let you view your program files and your Web pages using the same browser look and feel.**

Typing a URL in the path line will convert the window into a Web browser.

The icon will change to indicate what type of window you're viewing. A Windows icon will mean you are viewing local files, and an Internet Explorer icon will be displayed for Web file viewing.



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Backspin

# Ticked off by unique tech in Feb-U-ary

I'm sorry. I said that this week I would revisit the incredibly popular issue of whether Adobe's PDF is a good thing or not, but I have been distracted by a lot of things that really annoy me.

Mark Gibbs

Now I must admit there are many things that really tick me off. Actually, make that many, many things. Put it down to my cynical and curmudgeonly nature. Mostly I dismiss them, keep my blood pressure down to a reasonable level and try to maintain my usual mellow composure.

But for some reason there has been a recent upswing in things that really make me mad. For example, I keep hearing people use the phrases "very unique" and "quite unique." Come on! Isn't it obvious that things are either one of a kind — that is, unique — or they're simply unusual?

I'm also sick and tired of advertising based on stupid concepts (the car manufacturers are major sinners), sitcoms that are so dumb they can cause serious mental damage to anything higher up the evolutionary ladder than a slug, and all of the vacuous anchor people on local TV news.

And jeez, am I glad we're in March at last. I got so aggravated by TV and radio announcers and just about every other media personality — all of whom should know better — saying "Feb-U-ary" . . . for God's sake! It is "Feb-RU-ary." Even the National Public Radio newscasters (without doubt the best news service around) couldn't get it right!

So what is the relevance of all this to our business? Well, something that has recently torqued my ire is the issue (hah!) of jumbo frames. Log on to *Network World*'s Web site and read the head-to-head pieces (www.nwfusion.com/forum/jumbo.html) by Selina Lo, of Alteon Networks, and Bernard Daines, of Packet Engines, that originally appeared in *Network World*'s Feb-RU-ary 23 issue.

If you haven't followed this minor brouhaha, it concerns whether we should limit the size of Ethernet frames to today's maximum size of around 1,500 bytes or allow frames to expand up to 9,000 bytes to increase network efficiency.

Ms. Lo and Mr. Daines pitched good arguments, and the folks who joined in on-line were equally articulate. But this argument raises two issues.

First, jumbo frames are simply an engineering matter. You want jumbo frames? Hassle your vendors to Picard it (as in "make it so"). Want to make the technology safe? Make sure that vendor implementations allow you to switch off jumbo frames.

As to whether jumbo frames are going to be more efficient — either simulate them or actually try them. The goal should be to *prove* your point. To engage in endless, abstract, theoretical debates over such issues is useless. Jumbo frames will either work or they won't.

Second, we've seen similar debates over all sorts of technologies: whether ATM is any good; whether Gigabit Ethernet will dominate the known IT universe; and whether there is, indeed, life after VLANs. I'm sorry to ask this, but to all of you who have been so enthusiastically engaged in such discussions: Why bother?

I suppose the mental gymnastics might be stimulating, but these are mainly issues in which the proof is in the pudding, so to speak. Where our analytical and argumentative skills are needed is not in figuring out how these technologies work, but rather, how they pay off.

I know the bits and bytes are interesting and that compared to the "soft" issues of business, "hard" technology is far more appealing, but that's not what the role of IT is really all about.

The problem is we're so used to dealing with the technical minutiae of computing that we forget we're trying to solve the biggest challenge our organizations will ever face — how to become and remain competitive in the 21st century.

*Your irritations to nwcolumn@gibbs.com or complain on (800) 622-1108, Ext. 7504.*

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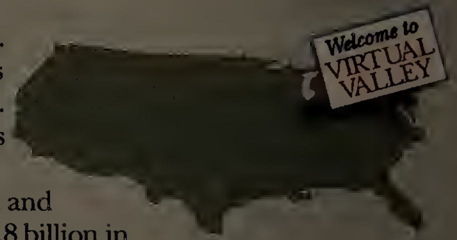
## 'NET BUZZ

The latest on the Internet/Intranet Industry

By Chris Nerney

**VENTURING INTO THE VIRTUAL VALLEY** Silicon Valley, Silicon Valley, Silicon Valley. That's all we ever hear when the topic of venture capital comes up. You'd think that's where they invented venture capital or something.

OK, so it is. Still, that doesn't mean California's high-tech mecca has to hog all the attention. There are other areas of the country where venture investors are pouring millions of dollars into high-tech companies, including Internet and intranet start-ups.



New England, of course, comes to mind. But the Southeast has quietly emerged as the nation's third-largest venture market.

Start-ups located in seven southern states — North Carolina, South Carolina, Tennessee, Georgia, Alabama, Mississippi and Florida — grabbed 9% of the record $12.8 billion in venture funds invested in 1997, trailing only Silicon Valley (28%) and New England (12%), according to the latest **Price Waterhouse Venture Capital Survey.**

This week the Southeast gets its due as some of the heaviest hitters in the venture world descend on **Duke University,** in Durham, N.C., for the **Southeast Technology Conference,** an event designed to highlight emerging technologies and increase investment in the region.

In addition to executives from **Montgomery Securities, First Albany** and **GE Capital,** the conference will feature large vendors such as **Microsoft, Cisco** and **Lucent** that are providing later-stage venture funding for promising start-ups. (More about that emerging trend next week.)

The high-tech hub in the Southeast is the **"Virtual Valley,"** which is centered around the **Research Triangle Park** area between Durham, Raleigh and Chapel Hill, N.C. One of the most active venture capital firms in the region is **Southeast Interactive Technology Funds (SITF),** which focuses exclusively on information technology start-ups located in the Southeast.

**William Glynn,** a partner at SITF, says his firm's investment portfolio reflects the diverse nature of Virtual Valley's high-tech start-ups.

Among the companies funded by SITF are:

- **HAHT Software, Inc.,** based in Raleigh, which makes application development tools
- **One Room Systems, Inc.,** a multimedia, high-bandwidth service provider in Durham that has developed the M-Net, an infrastructure for storing, hosting and delivering graphics-heavy data
- **Accipiter, Inc.,** an Internet advertising software provider, also located in Raleigh
- **BuildNet, Inc.,** an online information center for the building industry

Glynn is especially bullish on Durham-based BuildNet, which is expected to close a $15 million third round of venture funding next month and plans to go public in the second quarter of 1999.

"BuildNet is going to be one of the hottest IPOs next year," he says.

**SEEK NO MORE** Fresh off last November's debut of its Web-based human resources applications software, start-up **Seeker Software, Inc.** has scored a $7.5 million funding round from several venture firms.

Investors in the latest round include **Brentwood Venture Capital, Information Technology Ventures** and **Advanced Technology Ventures.**

The company secured a $3 million venture deal in February 1997.

Seeker's Workplace software is designed to automate the administration of human resources functions by giving employees access to their own records using Web browsers.

Worker access to a compensation and salary management application? The possibilities are downright intriguing.

**ALRIGHT, WHO ARE YOU AND WHAT HAVE YOU DONE WITH SCOTT MCNEALY?** Is it just us, or do you wonder if the **Scott McNealy** who pleaded with Congress last week for anti-trust protection from Microsoft is the same **Sun** CEO who has been bragging for the past two years that the Java programming language and the network computer would destroy the Windows stranglehold on the enterprise desktop?

*Competition be damned, 'Net Buzz seeks its own monopoly on your best Internet- and intranet-related news. Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.*

3M supports 50,000 products in over 60 countries.

Who helped 3M build their high-speed switched network?

Xylan.

3M, a $14 billion company with more than 70,000 employees, creates, manufactures and sells 50,000 innovative products in over 60 countries worldwide. 3M is a company whose networking needs are constantly growing and changing. “We need to have a great deal of flexibility to rapidly respond to new business opportunities,” says Tom Collins, Telecommunications Manager for 3M. “Xylan offers the most scalable solution integrating switched Ethernet and ATM. At 3M, we’ve adopted Xylan technology as our global standard for switches.”

**Switching:** LAN, Layer-Three, ATM, Gigabit.
**Interfaces:** Ethernet, Fast Ethernet, Gigabit Ethernet, ATM, Token Ring, FDDI, Frame Relay, Voice, ISDN.
**Services:** Firewalls, Authentication, Multicast, Broadcast Management, Protocol Translation, Mobility, QoS, Prioritization, Compression, Policy-Based Management.

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For a full case study:
www.xylan.com/apps
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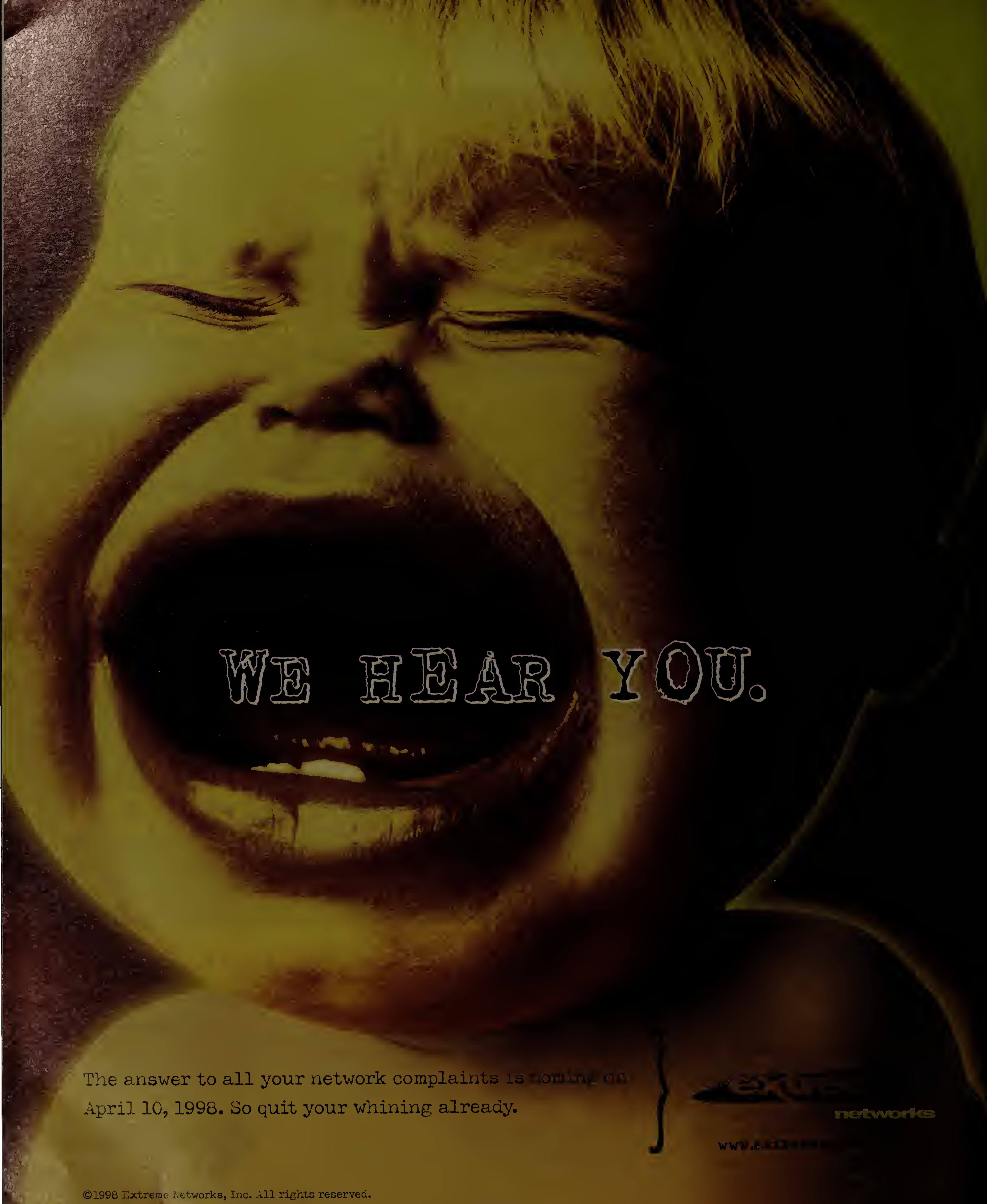

The answer to all your network complaints is coming on April 10, 1998. So quit your whining already.

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*Circle Reader Service #**19***

# Frame Relay '98 Showcase

**ADC Kentrox**, the Network Access Company™, is the world's leading provider of high-speed WAN access equipment for global networks. The company's DataSMART® T1 Frame Monitoring DSU/CSUs help customers manage their Frame Relay network from end to end. These open, standards-based DSU/CSUs continuously gather detailed statistics on network availability, bandwidth utilization, congestion, delay, and excess bursting. With this information, the user can identify network problems, monitor and control the DSU from a central location, and control wide-area network access costs.

ADC Kentrox®
The Network Access Company™
www.kentrox.com

**ADTRAN** was established in 1985 to design, develop, and manufacture advanced transmission products for high-speed digital communications. Today, ADTRAN is a primary provider of DDS/Frame Relay, ISDN, T1/FT1, and HDSL digital loop products to Regional Bell Operating Companies and many well-known OEMs. In addition to its Telco products, ADTRAN offers a broad selection of customer premises equipment, including a complete line of DSU/CSUs, a variety of ISDN extension and network terminating products, flexible T1 multiplexers, and a new integrated access device, the ATLAS 800.

ADTRAN
www.adtran.com

**CRL Network Services** is a leading national data networking company specializing in wide area frame relay, IP, and ATM networking. CRL owns and operates a fully redundant, fault-tolerant ATM backbone with points of presence in all major metropolitan areas. CRL's network consultants and technical support teams leverage extensive multi-protocol networking experience to provide personalized, end-to-end WAN integration, implementation, and support for your enterprise. CRL offers aggressive service guarantees and highly competitive pricing.

CRL
NETWORK SERVICES
www.crl.com

Headquartered in Marlboro, MA, **Concord Communications** is the leading supplier of web-based, automated network reporting and analysis solutions that provide customers with the information they need to effectively plan and manage the growth of their enterprise networks. Concord's Network Health® suite of applications addresses performance management at multiple levels of your enterprise network, giving managers a complete and accurate picture of the network from the link to the switch to the router and, finally, to network usage by application, user and department. Key modules include Network Health — LAN/WAN, Frame Relay, Router/Switch, Server, Traffic Accountant, and Service Level Reports.

CONCORD
The Total View™
www.concord.com

**Digital Link Corporation** (NASDAQ;DLNK) designs, manufactures, markets and supports a broad range of high-speed digital access products ranging from 56 Kbps to 155 Mbps for global wide area networks. The company's products are used by service providers as infrastructure equipment and by business enterprises for connectivity to WAN services such as leased lines, frame relay, XDSL, SMDS and ATM. The company is known for its innovative management of frame relay network performance monitoring. IPM is a comprehensive and scalable product suite for managing end-to-end performance of frame relay networks for easier troubleshooting and improved network planning. Digital Link is headquartered in Sunnyvale, CA with worldwide sales offices in the UK and Germany.

Digital Link
www.dl.com

**EQUANT** owns and operates the world's largest telecommunications network, which covers over 225 countries and territories and has more than 120,000 user connections worldwide. The network offers a broad range of voice and data solutions to multinational corporations, with local support available from over 150 help desks around the world. EQUANT's Frame Relay Service is being made progressively available worldwide, with a country coverage unsurpassed in the industry.

EQUANT
www.equant.com

**Hypercom's** Integrated Enterprise Network (IEN) gateways and access devices enable the construction of integrated WANs combining voice, data, fax, and video traffic using a range of services such as frame relay, ATM, IP, ISDN and X.25. By consolidating client/server LAN traffic with legacy systems, as well as with voice and video traffic, IEN helps users and carriers implement Virtual Private Networks and intranets that cut telecommunications costs considerably without sacrificing quality, service or reliability.

HYPERCOM®
Network Systems
www.hypercom.com/netsys

To meet the ever-changing demands of network managers and service providers, **Kaspia Systems** developed the Kaspia Network Audit Technology™. This system automatically discovers all sources of statistical information on the entire enterprise, regularly polls and collects network information, then analyzes and reports the data via a web-based report center. Offering extensive discovery and inventory capabilities, in addition to point-to-point correlation of frame relay information, Kaspia broadens the scope of reality on your network.

kaspia
systems
www.kaspia.com

**NetScout Systems** provides network monitoring and analysis solutions that organizations use to run their enterprise networks more efficiently and cost-effectively and to plan for future growth. It is the industry leader in powerful, proactive solutions for network operations, particularly application traffic monitoring, diagnosis and reporting, that allow network managers to optimize quality of service and deliver on service-level agreements. The NetScout product family consists of NetScout Probes and NetScout Manager Plus management software that support any type of topology and any type of network traffic.

NetScout
www.netscout.com

**MICOM** Communications Corp., a Nortel (Northern Telecom) company, manufactures two main product lines that enable companies to dramatically reduce company-wide communication costs; 1) networking solutions that integrate data, voice, fax, and local area network (LAN) over public frame relay and private line networks; and 2) phone/fax IP gateways that add voice/fax to any IP network. Micom is the world leader in providing data/voice integration products, with over 40 percent market share in both markets. Phone: (805) 583-8600.

NORTEL MICOM
www.micom.com

**Sprint's** applications-based frame relay services — for SNA and LAN interconnection — ensure that your applications will achieve private line-like performance over a more cost-effective frame relay network. Each service features aggressive performance guarantees, along with the migration support, equipment, and network management options like Visual UpTime® you need to successfully implement frame relay. Sprint was the first major carrier to offer innovations designed to help your business do more business.

Sprint
www.sprint.com

**Sync Research** provides complete Frame Relay access and service level management solutions for business critical networks. The FrameNode family of multiservice frame relay access solutions converges business-critical SNA, IP/IPX and voice/fax branch applications using award-winning quality of service and management features. The Frame Relay Access Probe (FRAP) line of circuit management solutions deliver proactive service-level management and troubleshooting capabilities to both enterprise and service provider users. Sync's TyLink series of digital transmission products offer cost-effective, SNMP-managed connectivity solutions.

sync
www.sync.com

**TimePlex Group** is a leader in wide-area networking solutions for voice, video and data integration. The strengths of the company include 29 years of networking experience, global networking product capability all supported by an established, global sales and full service infrastructure, and a loyal, presitigous customer base unmatched in the industry. Additionally, the breadth of the TimePlex Group product family includes solutions for multinational compressed voice, Voice Over Frame Relay, ATM Access, remote LAN access, and T1/E1 networking using private or public services.

TimePlex Group
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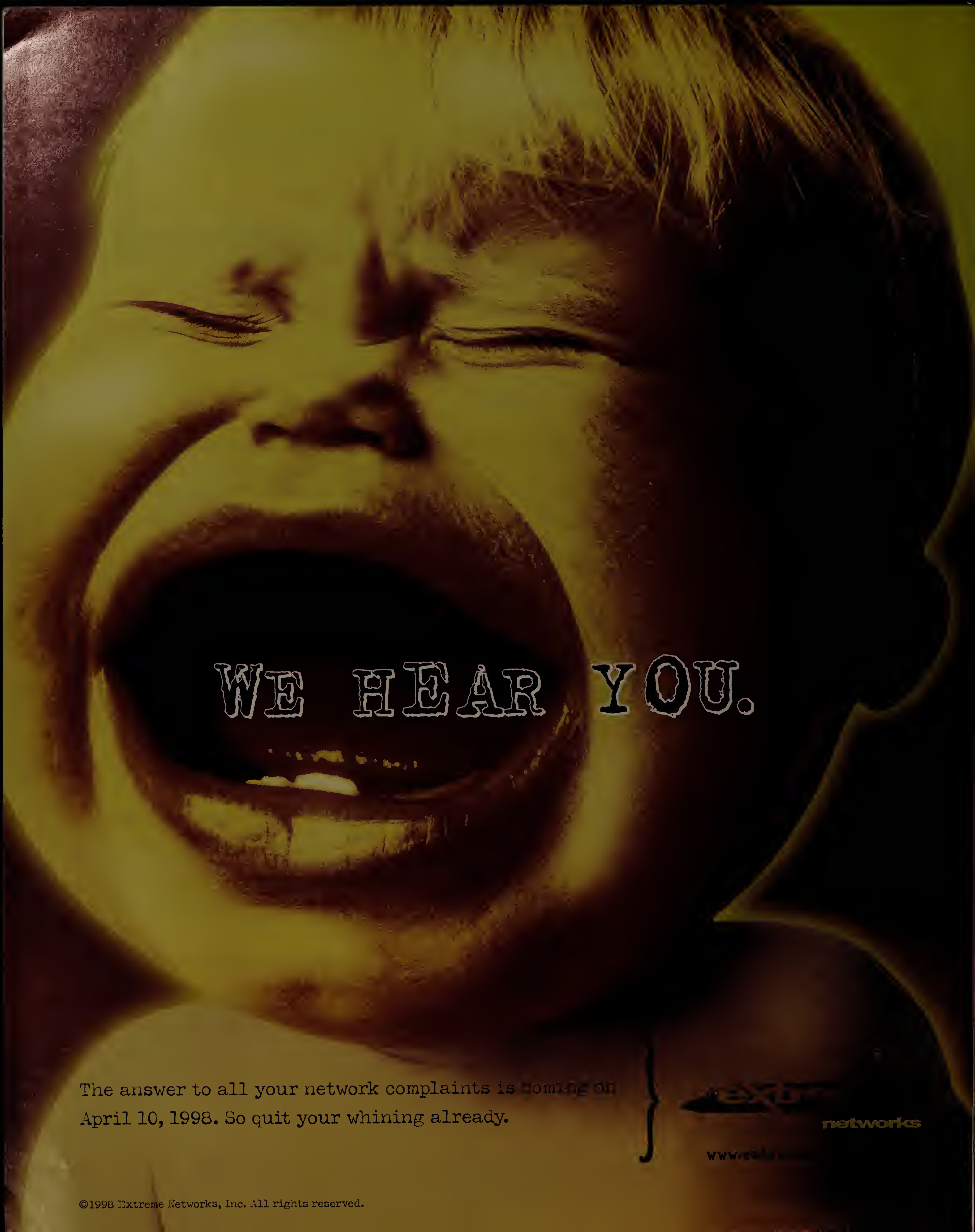

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